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# aircraft

## illustrated



AIRSHOW 82  
82  
— preview and programme —



F-18 enters USN service • Air Defence of the UK  
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# aircraft illustrated

May 1982 Vol 15 No 5

Editor Martin Horseman  
Deputy Editor Allan Burney  
Contributing Editor Peter R. March  
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Tina White  
Design Bob Wilcockson

Cover overall: An unusual angle on a TF-18A from VFA-125 — the Hornet Training Squadron — based at NAS Lemoore, Ca. With the Hornet now approaching front-line operational service with the US Navy and Marines, the aircraft is being seen in increasing numbers; as can be noted from the F-18 features on pages 215-217, this issue.

Photo: McDonnell Douglas

Cover inset: Part of the static display at Ramstein AB, W Germany for *Flugtag 81* held on 2 August 1981. An estimated 700,000 visitors attended the event and the organisers are hoping for a similar turn-out for *Flugtag 82* on 1 August.

Photo: Ben J. Ullings/Aviation Photos International

Frontispiece: 'A Tiger in Dragon Country' — Hong Kong's military airfield at Sek Kong is dominated by the operations of AAC Scout and RAF Wessex helicopters, but from among all this rotary activity occasionally emerges a solitary Tiger Moth. Finished in authentic RAF camouflage and markings, the aircraft belongs to Dave Baker, a Cathay Pacific Airways pilot. Tiger Moth T-6645 was built in 1941 and delivered to the RAF's No 29 Elementary Flying Training School at Cliffe Pypard, near RAF Lyneham, Wilts; it is in these markings that it has been painstakingly and accurately restored. In 1946, T-6645 was sold to the London Transport Flying Club at Fairoaks and registered G-AIIZ, being painted red and silver. Dave Baker's father was the Chief Flying Instructor of the Club and flew 'India Zulu' until July 1976 when Dave took it to Hong Kong and restored it to its original 1941 RAF colours.

Photo: Adrian M. Balch

This picture: The first AV-8B Harrier II V/STOL light attack aircraft built jointly by McDonnell Douglas and British Aerospace started its flight development programme on 5 November 1981 with five 'hovers' at the Lambert-St Louis International Airport. The RAF will be equipped with 60 AV-8Bs designated Harrier GR5.

Photo: McDonnell Douglas



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This issue of *Aircraft Illustrated* contains our annual preview and events listing for the forthcoming air display season. The 'airshow 82' coverage can be found on pages 226-237 and it is hoped that the guide will constitute a handy reference. News of subsequent developments in the season's calendar will be regularly featured in the 'airview' column of the magazine along with an advance monthly re-cap.

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## airscan

Paul Humphreys

THE one thing that I am loathe to do, is to try to predict with any accuracy what will, or will not, happen in aviation during the years ahead. Who, for example, in 1950 would have put much money on the predictions that there would be satellites in orbit within 10 years, men walking on the moon within 15 years and shuttles into and out of space in 30 years? That is why this month's allocation of Humphreys' mad money is staying firmly pocketed when someone not only forecasts that tomorrow's fishermen will fly but also produces drawings of an aerial catamaran trawler!

A local visionary in Suffolk opines that although the fishing industry uses modern technology in many aspects of the daily hunt for fish in the oceans of the world, very little has been done to change or improve the vessels in which it all happens.

He underlines the superior speed and mobility of aircraft in getting to and from the fishing grounds and so proposes a squadron of flying fishing boats — with a conventional trawler to act as a base and mother ship — that could alight on the surface of the sea where shoals of fish had been located from the air. Once seaborne, the crew then have the choice of slow trawling, fast trawling or 'even faster air trawling by means of the equipment we have designed to suit the machines'.

Now, it is 40 years since I last drove a pencil and slide rule in anger in an aircraft design office and, no doubt, things have changed and improved since then, but this last bit about netting fish from the air goes rather too far. One cannot conceive of materials, aerodynamics or any techniques which would allow half a ton of fish to be dragged through the water at speeds in excess of 100kts by an aeroplane. Even slow trawling from a surface vessel has its hazards. If a large shoal of fish, within a slow moving purse seine net, are frightened they can move quickly in unison and have been known to capsize fishing vessels.

There cannot be too many days in the year when the sea state in Europe's distant-water fishing grounds will allow the safe operation of flying boats from open water — even those in which, as proposed, one mainplane can be raised vertically to act as a sail when slow trawling!

Among other design and operating features

of this remarkable project, are 'hulls as tough as any marine craft, the ability to plane and slice through waves at speeds much higher than would be safe in a fast monohull, and to skim, alight and take-off rapidly around the stalling speed'. This unlikely craft is described as being slow but stable and able to carry worthwhile loads at about 100kts. There is, of course, no need for oxygen or pressurisation because the operating altitudes are between sea level and 500ft.

Apart from commercial fishing, the designers see other uses for this boat which flies. A tycoon's luxury yacht providing office, boardroom and living accommodation plus high speed transport around the world; as a work boat for the offshore oil and gas industries, or for ASR, inshore patrol and weather reporting duties.

My initial reaction is one of complete incredulity and a belief that this must be one project that will never get off the ground — or the water. But with hindsight, who knows with absolute certainty that something like this will not be achieved at some time in the future. Remember satellites, moon walkers and space shuttles?

### David and Goliath

It must be a long time since the giant and highly successful Boeing Airplane Co sustained a blow as severe as the cancellation of an order for 15 of its new Boeing 757 airliners.

American Airlines' decision to pull out of this \$600 million contract resulted from its lower than anticipated profits during 1981 plus the generally depressed state of the world's airline industry. But American Airlines also has 30 wide-body Boeing 767s on order and was one of the few operators that made a profit out of its 1981 operations.

As with all cancellations and cutbacks in almost any industry, it is not just the prime contractor — in this case, Boeing — which is affected. American Airlines' decision was a blow for Pratt & Whitney and its new PW2037 turbofan which would have powered these 757s and, of course, to the thousands of Boeing sub-contractors and suppliers. And in the aerospace industry, there aren't many other big production programmes like those of Boeing, which can replace lost orders and full manufacturing facilities.

The thought which must be in all their minds is that if a profitable airline cannot afford to buy the new aeroplanes it needs, how will the others who are in the red be able to purchase them? One wonders whether there will now be other cancellations or postponements in the long forecast new round of world airline fleet re-equipping.

Above: The new Boeing 757 twinjet made its maiden flight ahead of schedule on 19 February — see 'airnews' item. Photo: Boeing

### Farmer's glory

It is almost certain that any aeroplane emanating from a company in which Desmond Norman is the moving spirit, will be unusual, if not unique, and will be aimed at a very special slot in the aviation market. Like the Islander and Trislander.

Now comes the NDN Fieldmaster agricultural aircraft (see page 221, this issue) which, in no way, contradicts this assertion. Its angular appearance and tricycle undercarriage make it unusual, the use of a titanium fertiliser hopper which is an integral airframe structural component is unique, and, clearly, it has been designed for a very specialised role on the aviation scene.

Designing and building an aeroplane of this type is a challenging task, both financially and technically. NDN Aircraft was fortunate to have been able to share equally with the National Research and Development Corporation the £1¼ million bill so far run up in the development of the Fieldmaster. But there are other equally challenging tasks, principally finding the location of the main market and the best production facilities. The answer to the first is — overseas. This is readily apparent from the fact that all the initial interest in the Fieldmaster and the deposits paid have stemmed from distributors in Australia, New Zealand and the United States. Thus the answer to the second point, where to build the beast, could well be the same. Overseas. Licensed production could be centred in one of these countries, although a suggestion that this aeroplane could be built in two or more places seems to point to a European manufacturing line as well.

However, NDN has other production schemes which have been discussed with the Department of Industry which could involve other British aircraft manufacturers or even the erection of a new factory.

### Hatfield, my Hatfield

Surprise, surprise. While scanning another well known aviation magazine, your man read 'British Aerospace (Hatfield) previously part of Hawker Siddeley Aviation...'. Now why stop there in the long look back in nostalgia. Wasn't there another aircraft company over at that Hertfordshire airfield? Had a sort of French name? Used to make those little yellow biplane trainers for the RAF and for flying clubs. Oh yes — and built a rather smart looking jet airliner back in the 1950s. Ah! You've remembered it too. You're older than you look.





Left: Puma HC1, XW199, of No 230 Squadron from RAF Gutersloh, W Germany perches precariously on top of a Bavarian peak while on detachment to the RAF Winter Survival School; each year about 150 aircrew attend the course, the syllabus of which includes helicopter familiarisation and rescue techniques. The posting allows Puma crews to practise flying in mountainous regions where there is often insufficient flat ground to land more than a single pair of wheels (as seen here).

Photo: RAF Germany by SAC Pete Boardman

## airnews

### 757 flies ahead of schedule

A week earlier than originally planned, the first Boeing 757 made its maiden flight from Renton Municipal Airport on 19 February 1982. Powered by Rolls-Royce RB211-535C engines, the 757 flew for 2hr 31min before landing at Paine Field, adjacent to the Boeing 747/767 plant at Everett, Wa.

The new airliner is the first of five that will make up the 757 test fleet to carry out a 1,000hr, 10-month flight programme leading to US FAA certification in December. It will be based at the Everett airfield until cleared by the FAA to operate from the smaller Boeing Field in Seattle.

The short-to-medium range airliner took-off from the 5,300ft Renton runway after a run of 3,800ft with a 15kts tailwind and climbed to the north. The 757 is equipped with a Forward Facing Crew Cockpit (FFCC) and the two-man crew evaluated the aircraft's handling characteristics at speeds up to 250kts IAS and heights approaching 17,500ft, as well as landing gear retraction and extension, speed brakes, minimum flying speed, operation of wing leading-edge slats, trailing-edge flaps, and all basic systems. After several minor difficulties, the test aircraft is now steadily progressing along its flight programme.

The first 757 delivery is scheduled for December, to Eastern Air Lines, with the other launch customer British Airways, receiving its first 757 in January.

### 150 Epsilon for French AF

Aérospatiale has been notified by *le Service Technique des Programmes Aéronautiques (STPA)* of an order for 150 Epsilon primary trainers for the French AF, including a confirmed order for a first batch of 30 aircraft; the initial production examples will be delivered to the service in 1983.

The Epsilon is a tandem two-seat military trainer that is powered by an AE10-540-L1B5D piston engine of 300hp with fuel injection and inverted flying capabilities. The cabin and instrument panel layout of the Epsilon, together with in-flight behaviour, is designed to place the trainee airforce pilot in an environment as close as possible to that

of the aircraft he will later fly during advanced training.

Two prototypes of the aircraft have accumulated over 460 flying hr since their maiden flights on 22 December 1979 and 12 July 1980 respectively. The prototypes have undergone several design changes due to unusual pitch-yaw coupling, including rounded and slightly upturned wingtips and a totally redesigned tail unit with a larger tailplane mounted on the fuselage and a ventral fin fitted. The Epsilon is marketed by Aérospatiale and manufactured under sub-contract by its subsidiary SOCATA.

### Tornado ADV demonstrates CAP capability

To demonstrate the Tornado ADV's long-range/long-loiter capability while on Combat Air Patrol (CAP), the first prototype (A01) has flown a CAP of 2hr 20min involving a total flight time of 4hr 13min with no air-to-air refuelling. Piloted by Paul Millett (BAe Warton Division's executive director, flight operations), with Les Hurst (ADV project navigator), in the rear seat, the aircraft carried four Sky Flash, two Sidewinders and two 1,500 litre subsonic drop tanks.

After climbing-out from BAe Warton, A01 completed a 325nm transit at high altitude across the North Sea and then descended to medium altitude to take up a CAP racetrack pattern. The patrol was flown for 2hr 20min and was typical of the way in which the Tornado will be operated in RAF service. At the end of the CAP, the aircraft returned to altitude for the flight back to Warton where it loitered in the local area for 15min at low-level before landing. More than 5% internal fuel remained at the end of the 4hr 13min sortie.

● Tornado crews of the German AF and Navy will receive their weapons training initially at Erding AB prior to the opening of the German Tornado weapons school at Jever AB in 1984.

### Invincible for Australia

The Government is to sell the Royal Navy's new anti-submarine carrier HMS *Invincible* to Australia for £175 million. The controversial but widely predicted decision was announced in February by Mr John Nott, the secretary of state for defence, and it is expected that the warship will be handed over in late-1983;

at a time when the second of the 'Invincible' class, HMS *Illustrious* is scheduled to become operational. To maintain the policy of two ASW carriers in the fleet, HMS *Hermes* will be retained until 1985 when the third of the 'Invincibles' is to enter service.

Australia has also expressed an interest in leasing a number of RN Sea Harriers but at the time of going to press no further announcement had been made. The Royal Navy is believed to be opposed to the proposal.

### Gatwick is fourth busiest international airport

London's Gatwick Airport is now the fourth busiest international airport in the world, according to the British Airports Authority (BAA). Statistics for the calendar year 1981 show that Gatwick's figure of 9.7 million international passengers was only beaten by three other airports throughout the world — Heathrow, J.F. Kennedy (New York) and Frankfurt. The figure for total passengers at Gatwick in 1981 reached 10.7 million.

Scheduled passenger traffic at Gatwick grew by 25% during the year with over 20 new routes started. Figures for charters, on the other hand, remained more or less static. Over 60% of flights are now scheduled services carrying 45% of the total passengers. Commenting on the announcement airport director, Pat Bailey said, 'We are well pleased with these figures, especially during a recession. Our international growth has taken us from sixth in 1980 to fourth in the world and even our domestic passenger figures have passed 1 million for the first time'.

### Dauphin 2 flies

The Aérospatiale SA365N Dauphin 2 helicopter made its maiden flight from Marignane in February with test pilot Max Jot at the controls and test engineers Jean Michaud and Jean Marty. The Dauphin 2 flew for 1hr 35min during which the overall operation of the anti-ship helicopter proved to be satisfactory.

The naval version of the Dauphin is derived from the model selected by the US Coast Guard and is the subject of a reported order of 24 aircraft from Saudi Arabia. Included among the main modifications to the navalised Dauphin is the fitment of the AS15TT weapon system, a deck landing hook for rough weather operations and new flight instrumentation and navigation equipment. Initial deliveries of the SA365N Dauphin 2 are planned for 1983.

AIRCRAFT ILLUSTRATED

### RAF accident reports

Three Jet Provost accidents on 8 May 1980, 31 July 1980 and 28 January 1981 are the subjects of the latest summary reports released by the Ministry of Defence. The respective statements are as follows:

#### Jet Provost T5A, XW314

Date: 8 May 1980. Parent Airfield: RAF Cranwell. Place of Accident: Nr RAF Swinderby. Crew: Two pilots. Casualties: Two.

Circumstances: On the morning of 8 May 1980 a Qualified Flying Instructor (QFI) briefed his student for a dual training exercise which was to include practice at entering and recovering from full and incipient spins. After demonstrating two spin recoveries at the incipient stage and giving the student practice at recovering from a fully developed spin, the QFI initiated a spin to the right and, as briefed, ordered the student to take incipient recovery action. The student mishandled the controls and after one further turn of the spin the QFI took control. As the aircraft entered a fully developed spin the QFI became confused because the aircraft was spinning to the left whereas he was expecting it to spin to the right. The rate of rotation was higher than the QFI had ever before experienced and although he took standard spin recovery action he assessed that the aircraft would not recover before it struck the ground; he therefore correctly gave the order to eject. Both pilots ejected successfully but suffered slight vertebral fractures during the ejection sequence. The aircraft crashed in a small copse and was destroyed. No civilians were injured nor was there any damage to civilian property.

Cause: The accident occurred because the QFI failed to correct immediately the error in the student's recovery from the incipient spin to the right and, as a result, the aircraft then entered a full spin to the left from which the QFI was unable to recover. The perception of the spin confused the QFI although it was aerodynamically normal and there was no question of aircraft unserviceability.

#### Jet Provost T3A, XN590

Date: 31 July 1980. Parent Airfield: RAF Church Fenton. Accident site: Nr RAF Elvington. Crew: One. Casualties: One major.

### ● Stop press

As we go to press, it was confirmed that the Trident 2 strategic weapon system will replace the ageing Polaris missiles as the UK's nuclear deterrent. The Trident 2 will equip four new submarines, each of which will displace 14,680 tons and will be equipped with 16 missile tubes. At present the Government plans to put eight warheads on each missile instead of the 14 it could carry. Trident 2 is said to have a range of 6,000 miles against the Trident 1's 4,000 and the 2,500 miles of the Polaris. The total procurement cost of the system is estimated at £7,500 million at 1982 prices. Trident 2 is projected to remain in service until 2020.

Below: The last of the three new UK-assembled BAe One Eleven srs 525s recently handed over to TAROM — the Romanian State airline — thereby completing this contract as an integral part of the previously announced 'ROMBAC' manufacturing licence agreement between BAe and CNIAI (the National Centre of the Romanian Aircraft Industry).

Photo: BAe Weybridge-Bristol



Circumstances: On 31 July 1980, Jet Provost XN590 was flown solo by a Qualified Flying Instructor on a staff continuation training sortie. Towards the end of the sortie he went to another airfield near to his base to practice circuits and landings. At about 400-500ft and 140kts, while climbing away from a roller landing, the pilot noticed a large flock of birds directly in front of the aircraft. The birds were too numerous to avoid; the pilot felt and heard several thumps and almost immediately lost engine power. Realising that he had insufficient height and speed to land back on the airfield, the pilot pointed the aircraft towards open ground and ejected at less than 250ft. The aircraft landed in wooded country and was destroyed. The pilot ejected safely, but suffered back injuries and bruising.

Cause: The evidence of the pilot and eye-witnesses quickly established that the engine flamed-out after ingestion of at least two racing pigeons following an unavoidable multiple bird strike. Investigation revealed that the birds had blanked off an estimated 30-40% of the total front area of the engine compressor, and engine failure at such a low height and speed left the pilot with no reasonable alternatives to a low-level ejection. It transpired that some 500 racing pigeons had been released 10 miles to the south of the airfield with an intended destination that was likely to lead them to overfly the airfield at about the time of the accident. However, the code of practice for pigeon fanciers that existed at the time did not require the release to be notified to that airfield and so neither the pilot nor the controllers at the airfield were aware of the potential danger.

Subsequent action: The RAF and the Royal Pigeon Racing Association (RPRA) co-operate closely at national level to reduce risks to aircraft and airfield operations arising from pigeon racing; both give wide publicity to the problem. Following this accident it was agreed that the RPRA should issue more detailed guidance to local clubs, including wider notification arrangements and firmer controls on the release of racing pigeons in the vicinity of RAF and other airfields.

Claims: A sum of £1,000 has been paid to the Forestry Commission for damage to woodland, while a claim concerning damage to a private driveway (caused by vehicles on their way to the scene of the accident) is under negotiation.

#### Jet Provost T5A, XW308

Date: 28 January 1981. Parent Airfield: RAF Linton-on-Ouse. Place of Accident: 4nm west of

RAF Leuchars. Crew: One (Student Pilot). Casualties: One fatal.

Circumstances: The pilot was a student undergoing navigation training in Scotland as part of a detachment which had been prompted by the forecast of poor weather at its base in the Vale of York. During the morning of 28 January 1981 he was briefed to fly a low-level navigation sortie from RAF Leuchars to another airfield, refuel, and return at high level the same day. The weather at Leuchars when the student pilot took off was 2/8 cloud cover at 700ft increasing to complete cover at 1,000ft with cloud tops reported as varying between 2,600 and 5,000ft. Visibility was 10km in smoke (light haze). The weather was within the student's limits and suitable for the planned sortie. The student pilot took off at mid-day from Runway 27, climbed straight ahead as briefed, changed to the Approach frequency at about 700ft by manually dialling it and entered cloud at an estimated height of 1,000ft. He requested and was given clearance to turn right on to a heading of 035°. He acknowledged this and the Regional Pressure Setting (RPS). This was his last transmission. The aircraft was next seen exiting cloud in a near vertical descent; fractionally later another eye witness saw the aircraft fly in a NE direction in a level flight attitude but banked to the right. Seconds later the aircraft crashed into a wheat field on the lower slopes of a hill, about 1min 43sec after take off. The student pilot made no attempt to eject and was killed instantly; the aircraft was destroyed.

Cause: The cause of the accident cannot be precisely determined. However, it seems likely that after acknowledging the RPS and clearance to turn, the pilot initiated a turn to the right while still in cloud. Having set the RPS on the main altimeter, the position that the compass course pointer was found in (010°) suggests that he started to move it on to 035°, his intended heading. This action required a change of hands on the control column and he may have been distracted from his instruments. The aircraft went into a steep spiral dive and the pilot possibly blacked out under the 'G' forces exerted as he tried to correct the loss of height. However, shortly after emerging from cloud evidence suggests that he started to roll the wings level and recover from the dive, but was too late to avoid hitting the ground. Although it is clear that the aircraft went out of control, it is stressed that the presumed sequence set out above is conjecture and that the exact chain of causation cannot be determined.

Claims: A claim for damage to crops has been settled.

## airnotes

The first of three Transall C-160 aircraft ordered by the Indonesian Government was delivered on 9 February 1982. The three Indonesian Transalls will be used for transmigration operations between Java and other Indonesian islands where large resettlement areas are available.

The Westland W30 has completed over 800hrs of development flying since its first flight in April 1979. A CAA IFR certificate was received in January 1982 and, at the time of going to press, the type certificate of airworthiness for passenger operations was imminent. US FAA certification for IFR operation is scheduled for August 1982.

To assist the launch of the *Mail on Sunday*, which will be issued for the first time on 2 May, the newspaper is to air transport pattern plates from London to its second printing location in Manchester. The delivery flights will run each Saturday evening from the roof of the International Press Centre in





Shoe Lane using a 'Twin Squirrel' of McAlpine Helicopters; scheduled flight time to Manchester is 1hr 10min with a 10min road journey thereafter to the print works.

Colt Executive Aviation has reached an agreement with the Devon and Cornwall Constabulary to provide a Squirrel helicopter to be based at the police headquarters, Middlemoor, Exeter; this being a one year extension to an existing contract. This additional coverage means that the aircraft, subject to police requirement, could be available for other authorities in the area such as the Health Authority, transferring patients from Cornwall to specialised medical units in other parts of the country, especially in bad weather when the ambulance service is unable to operate.

Two more airlines, Air Botswana and Trans-Jamaican Airlines, have joined the International Air Transport Association (IATA). Air Botswana operates domestic services as well as flights to Johannesburg, Lusaka and Salisbury and its fleet comprises one Fokker F-27 and two Douglas DC-3s. Based at Sangster International Airport, Montego Bay, Trans-Jamaican Airlines operates domestic scheduled and charter services with a fleet of two Britten-Norman Trislanders, two Islanders, one Douglas DC-3 and three Cessnas. Membership of IATA now totals 116 airlines — Arabia (Arab International Airlines), which ceased operations last year, is no longer a member.

BAe Dynamics has received a full production contract, initially worth £40 million, to supply components for the AIM-9L Sidewinder air-to-air missile. This follows on from an earlier £5 million contract to produce and validate the first production quantities of AIM-9L units. West Germany, Norway, Italy and the UK are participating in the joint programme to build the US-designed AIM-9L Sidewinder in Europe. In UK service the air-to-air missile will arm RAF Phantom and Tornado F2 interceptors, the Hawk and RN Sea Harriers.

● An agreement has been signed between BAe Dynamics and United Technologies,

under which United's Norden Systems will manufacture the British Rapier missiles in the United States. The announcement follows the sale of the Rapier all-weather low-level air defence system to the USAF for the defence of its UK airbases.

McAlpine has received CAA approval for flight operations on a worldwide basis. British Airways and British Caledonian are the only other UK airlines with similar concessions and McAlpine Aviation is the only non-scheduled UK operator with permission to carry out charters anywhere in the world.

The Fiat G-91 was retired from front-line service with the *Luftwaffe* on 11 February, when four aircraft of *JBG-41* flew for the last time from Husum AB. The unit will re-equip with the Alpha Jet.

After several months of speculation, British Airways has sold its Boeing 747-200F Freighter, G-KILO, to Cathay Pacific Airways for a reported price of £25 million.

The RJ500 turbofan being developed jointly by Rolls-Royce and Japan Aero Engines has begun its ground testing at Derby. Designed for the new 150-seat airliners being studied by various manufacturers, the RJ500 in its initial form will produce some 20,000lb thrust, while production engines — designated RJ500-35 — will be capable of providing up to 24,000lb thrust. A second engine has also started running at the Ishikawajima-Harima plant near Tokyo.

The first MBB/Kawasaki BK117 helicopter in police configuration has been ordered by the German State of Bavaria. The aircraft is due for delivery to the Munich-based Police Helicopter Squadron by mid-1983. Equipment fitted in the BK117 for its Police mission will include an auxiliary long-range fuel tank, rescue winch, external load hook, searchlight and outboard loudspeakers. It will be employed in a variety of roles such as traffic observation, SAR missions, VIP and personnel transport and crime fighting tasks.

Left: Southend Airport-based Harvest Air has equipped its BN-2A Islander fleet with spray-bars midway between the wings and tail. The operator's first Islander, G-BJSA (see 'air register' Mar 82, p106) was photographed making a low approach and overshoot at Stansted on 8 February. Photo: George W. Pennick

## Airline Orders

Airline	Aircraft	No	Ordered	Delivery date
British Caledonian	Westland 30	1	1-81	1-82
Cyprus Airways*	Airbus A310	2	25 Feb 82	Feb & Mar 84
Helicopter Hire Iberia*	Westland 30	2	1-81	m-83
	Boeing 747-200B	1-f	Feb 82	Mar 82
Pelita Air Services*	Fokker F28 Mk 4000	1	Feb 82	Oct 82
Ranger Helicopters*	Bell 214ST	3-o	25 Feb 82	e-83
SFO Helicopter Airlines*	Westland 30	2-f	19 Feb 82	1-83
South African Airways*	Boeing 737-200	4-o	19 Feb 82	1984
US Air*	Boeing 737-300	10-o	25 Feb 82	n.d.

## Notes

### Airline Orders

**Cyprus Airways:** The two General Electric CF6-80A-powered A310s will be introduced to Cyprus Airways' Larnaca-London route and will replace Boeing 707s. The first A310 was scheduled to make its maiden flight in early-April 1982. Orders for the Airbus Industrie A310 now stand at 180 (90 firm and 90 options).

**Iberia:** The announcement of a previously unreported order for the airline's seventh Boeing 747. The aircraft was handed over to Iberia, the national airline of Spain, in March (see 'deliveries' section).

**Pelita Air Services:** Indonesia-based Pelita is a subsidiary of state oil company Pertamina.

**Ranger Helicopters:** The company began operations in 1975 using a Bell 47G-4 and currently flies a fleet of Jet Rangers and Long Rangers for utility services throughout Canada.

**SFO Helicopter Airlines:** The commuter airline will use the Westland 30s between San Francisco International Airport and Oakland International Airport, as well as on other routes in the area.

**South African Airways:** Like the Iberia 747 purchase, this order was revealed prior to the aircraft's delivery in March.

**US Air:** The options for the 737-300 are in addition to 10 firm orders and 10 options placed by the airline on 10 March 81 (see May 81, p203). The 737-300 is a re-engined turbofan-powered variant of the aircraft.

## Airline Deliveries

Airline	Aircraft	No	Delivered	Date ordered
Dolphin Airways*	EMB-110P1	6	e-82	n.d.
Iberia*	Bandeirante Boeing 747-200B	1	Mar 82	(see notes)
South African Airways*	Boeing 737-200	1	Mar 82	(see notes)
Swissair*	DC-10 srs 30 ER	1	3 Mar 82	12 Jun 80

## Notes

### Airline Deliveries

**Dolphin Airways:** The new Tampa, FL-based airline is operating the six Bandeirantes on routes to Savannah, Ga and Charleston, SC as well as 14 destinations in the state of Florida.

**Iberia:** Delivery of the aircraft reported in the 'orders' section.

**South African Airways:** See 'Airliner Orders' entry.

**Swissair:** The first of two DC-10 srs 30 ER (extended range) aircraft for Swissair — the second example was scheduled to be delivered at the end of March. Over the coming months, the two latest DC-10 srs 30s in Swissair's fleet — flying since the beginning of 1980 — will be modified to the same extended range capability as the DC-10 srs 30ER.

With these four aircraft the carrier plans to operate certain routes non-stop, thereby cutting travelling times. In particular, this will be the case with some services to South America making at present a fuel stop at Dakar.

The 15% range improvement of the new DC-10 srs 30ER is achieved by the installation of an additional fuel tank in the rear cargo hold, raising fuel capacity from 138,200 to 144,000 litres.

## Key:

n.d.=no details, e=early months of the year, l=latter months of the year, f=firm orders, o=options, \*see notes.

# airregister

Compiled by Alan J. Wright

A VERY lean month for in-sequence additions, the only entries worthy of note being the ex-Arkie Islanders. Monarch's two new Boeing 737s appear, while Dan-Air and Air Europe share another pair. The last named will be receiving another two in the near future, these being the aircraft from Air Florida on lease for the summer. This time N53AF and N54AF have been allocated G-BJXL and 'XM' respectively. Down the scale Genair continues to expand its Bandeirante fleet, the latest arrival being the fourth of the type for the Liverpool airline.

Registration	Type	C/n	Owner or operator
G-BJUN	Bell 206B JetRanger	3569	CSE Aviation Ltd
G-BJOV	Cessna F150K	0558	Falcon Flying Services (PH-VSD)
G-BJUC	Robinson R22	0228	Jones & Brooks Ltd
G-BJVC	Evans VP-2	63-10599	R. G. Fenn
G-BJWE	Bell 47G-5	7960	Rotair Ltd (SE-HBT)
G-BJWF	Ayres S2R-R35 Thrush Commander	R35-006	Shoreham Flight Simulation (N4018V)
G-BJWK	FRED srs II	29-10767	M. W. Boulton
G-BJWL	BN-2A-8 Islander	166	Harvest Air Ltd (4X-AYC)
G-BJWM	BN-2A-26 Islander	717	Harvest Air Ltd (4X-AYE/G-BCAE)
G-BJWN	BN-2A-8 Islander	316	Harvest Air Ltd (4X-AYL/SX-BFC/4X-AYL/G-BALO)
G-BJWO	BN-2A-8 Islander	334	Harvest Air Ltd (4X-AYR/SX-BBX/4X-AYR/N91CA/G-BAXC)
G-BJWP	BN-2A-26 Islander	399	Harvest Air Ltd (4X-AYP/SX-BFD/4X-AYP/SX-BFA/4X-AYP/N57JA/G-BCEJ)
G-BJWX	PA-19 Super Cub 95	18-1984	D. E. Lamb (MM52-2385)
G-BJXA	Slingsby T67A	1994	Slingsby Engineering Ltd
G-BJXB	Slingsby T67A	1995	Slingsby Engineering Ltd
G-BJXD	Colt 17A balloon	383	Hot Air Balloon Co Ltd
G-BJXE	Boeing 737-219	22657	Dan-Air Services Ltd (N851L)
G-BJXF	Cessna 441 Conquest	0263	Rogers Aviation Ltd
G-BJXG	Beech F90 King Air	LA-198	Eagle Aircraft Services Ltd
G-BJXH	Beech B200 Super King Air	BB-1072	Eagle Aircraft Services Ltd
G-BJXI	Thunder A7-77 balloon	407	Thunder Balloons Ltd
G-BJXJ	PA-28R-200 Cherokee Arrow	7435289	J. R. Anderson (OY-CBG)
G-BJXK	Cameron D-50 balloon	818	Cameron Balloons Ltd
G-BJXL	Colt 56A balloon	401	Hot Air Balloon Co Ltd
G-BJYM	One-Eleven 515FB	208	Dan-Air Services Ltd (TI-LRK/G-AZPE/D-ALAS)
G-BJYN	Boeing 737-2S3	22660	Air Europe Ltd
G-BJYO	Boeing 737-2T7	22762	Monarch Airlines Ltd
G-BJYP	Boeing 737-2T7	22761	Monarch Airlines Ltd
G-BJYQ	AA-5A Cheetah	0851	Ulmke Metals Ltd (N26972)
G-BJYR	Osprey Mk 4G2 balloon	ASC-205	A. P. Russell
G-BJYS	BHMD balloon	350	D. R. Meades
G-BJYT	Portswood XVI balloon	ASK-180	R. S. Joste
G-BJYU	Portswood XVI balloon	ASK-179	R. S. Joste
G-BJYV	Portswood XVI balloon	ASK-178	R. S. Joste
G-BJYW	Swan Mk 1 balloon	01	R. S. Joste
G-BJYX	Portswood XVI balloon	ASK-173	R. S. Joste
G-BJYX	Osprey Mk 4H2	ASC-238	A. G. Coe & S. R. Burgess
G-BJYX	Lovell Mk 1 balloon	01	G. P. Lovell
G-BJYX	Osprey Mk 4G balloon	ASC-213	P. J. Rogers
G-BJYX	Osprey Mk 7 balloon	ACK-100	K. R. Bundy
G-BJYX	Osprey Mk 4D balloon	ASC-127	C. F. Chipping
G-BJYX	Osprey Mk 4D balloon	ASC-130	C. F. Chipping
G-BJYX	Osprey Mk 1E balloon	ASC-138	C. F. Chipping
G-BJYX	Osprey Mk 4D balloon	ASC-122	C. F. Chipping
G-BJYX	Portswood XVI balloon	ASK-271	S. McDonald
G-BJYX	Osprey Mk 4D balloon	ASK-277	S. T. Wallbank
G-BJYX	Osprey Mk 4D balloon	ASK-251	G. M. Smith
G-BJYX	Osprey Mk 4D balloon	ASK-276	M. Thomson
G-BJYX	Osprey Mk 4D balloon	ASK-280	M. L. Partridge
G-BJYX	Jefferson Mk IV balloon	01	J. R. Sumner
G-BJYX	Osprey Mk 4G balloon	ASC-211	R. S. Wareham
G-BJYX	Osprey Mk 4D2 balloon	ASC-244	P. Middleton
G-BJYX	HP137 Jetstream 200	241	Gloe-Air Ltd (G-BCGU/G-AXRI)
G-BJYX	Bensen B8	01	The G-GYRO Group
G-BJYX	Enstrom F-280C-UK	1064	Supaglide Ltd (G-BEYR)
G-BJYX	Enstrom F-280C	1221	Business Forms Ltd (G-BJFG)
G-BJYX	Enstrom F-28A-UK	258	A. G. Christmas Ltd (G-BBRS)
G-BJYX	AS350B Ecureuil	1547	The Colt Car Co Ltd
G-BJYX	Hiway Demon Trike	80-00029	E. B. Jones
G-BJYX	Weedhopper II	GNM-01	G. N. Mayes
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G-BJYX	Eagle Microlight	3018	L. W. Cloud
G-BJYX	Flexiform Skytrike	FR500010	M. Huntley
G-BJYX	Hiway Skytrike	2176	G. A. Archer & V. Nordigian
G-BJYX	Typhoon Skytrike	DJ-01	D. Johnson
G-BJYX	Skycraft Scout	DKM-01	D. K. MacDonald
G-BJYX	Scorpion Microlight I	A0013	D. V. Collier & M. A. McBride

Registration	Type	C/n	Owner or operator
G-MBIM	Sea Eagle Microlight	3205	Ace Microlight Aircraft Co Ltd
G-MBIN	Skycraft Sea Scout	364	I. F. Kerr
G-MBIO	Eagle Microlight 2	4007	B. J. C. Hill
G-MBIP	Hummingbird Microlight	069	Micro Aviation Ltd
G-MBIR	Hummingbird Microlight	070	Micro Aviation Ltd
G-MBIS	Eagle Microlight	3182	I. R. Bandal
G-MBIT	Hiway Demon Skytrike	2501	Kverneland (UK) Ltd
G-MBIU	Wills Microlight	MEW-01	M. E. Wills
G-MBIV	Flexiform Skysails	EJPT-01	E. J. & P. T. Orritt
G-MBIW	Hiway Demon Triflyer	019/51081	Mainair Sports Ltd
G-MBIX	Ultra Sports Microlight	81-00087	D. Little
G-MBIY	Ultra Sports Microlight	81-00067	E. M. Woods
G-MBIZ	Mainair Triflyer	039-251181	E. F. Clapham & ptrns
G-MBJA	Goldwing Microlight	EW-34	A. A. Mol
G-MBJB	Hiway Skytrike	2557	P. Cooper
G-MBJC	Eagle Microlight	3351	S. W. England
G-MBJD	Eagle Microlight	4169	R. W. F. Boarder
G-MBJE	Chargus Microlight	MEG-01	M. E. Glanville
G-MBJF	Hiway Skytrike Mk II	80-00099	A. P. Clark
G-MBJG	Airwave Nimrod	165045	I. O. W. Microlight Club Training
G-MBJH	Chargus Titan	07	I. O. W. Microlight Club Training
G-MBJI	Scorpion Microlight	002	Robert Montgomery Ltd
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G-MBJO	Cherokee Microlight	5100680	R. J. Garland
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G-MBKA	Mistral Trainer	001	Micro Engineering
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G-MBKC	Lightning Microlight	DAI-01	D. A. Izod
G-MBKD	Vortex 120P-T250	TK-01	T. K. Knight
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G-MBKN	Chargus TS440 Titan	14/80-00041	Chargus Gilding Co Ltd
G-MBKO	Chargus TS440 Titan	13/80-00047	Chargus Gilding Co Ltd
G-MBKP	Hiway Skytrike 160	RAD-01	R. A. Davis
G-MBKR	Hiway Skytrike	EC25P504	C. J. Macey
G-MBKS	Hiway Skytrike 160 srs 1	21X7	J. H. M. Houldridge
G-MBKT	Mitchell Wing B10	TB-01	T. Beckett
G-MBKU	Hiway Demon Skytrike	25M2	P. W. Twizell
G-MBKV	Pterodactyl Microlight	PT-105	R. C. H. Russell
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G-MBLA	Flexiform Skytrike	0012	A. A. Prescott
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G-MBLC	Mainair Triflyer	DR-01	D. Robertson
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G-MBLG	Chargus Titan T38	1580-00069	P. R. F. Glenville
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G-MBLJ	Elipper Quicksilver MX	FSE-02	Flylight SE
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G-MBLL	Eagle Microlight	JDB-01	J. D. Burton
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G-ZIP1	Robin DR400/180	1557	Headcorn Flying School Ltd



# airbooks

**The Royal Air Force — Today and Tomorrow** by Grp Capt R. A. Mason CBE, MA, RAF, published by Ian Allan Ltd (144pp illus text incl 4pp colour) at **£9.95**

With a number of important aircraft types poised to enter RAF service in the 1980s, the decade will rate as one of the most significant in its long and distinguished history.

It is appropriate that a Tornado is featured on the cover of 'RAF Today and Tomorrow', as it falls to this aircraft to provide the backbone of the RAF's strike and defensive capabilities until the turn of the century. The Tornado will be supported in its air defence role by Nimrod AEWs and VC10 tankers, both proven designs that have been retrofitted with sophisticated equipment and will soon enter service. Meanwhile the maritime role is being carried out by growing numbers of Nimrod MR2s and tactical mobility is being enhanced by the advent of the Chinook helicopter and 'stretched' Hercules.

Therefore, the publication of the book during this transition period is timely as, apart from its topicality, it also allows the selection of photographs to be more diverse. Like the previous titles in the 'Today and Tomorrow'-series ('The British Army' and 'The Royal Navy'), it relies strongly on its visual appeal and the illustrations cover

every aspect of modern RAF operations — from the fast-jet frontline squadrons with their Jaguars and Harriers etc. to the Alvis Spartan APC of the RAF Regiment.

Grp Capt R. A. Mason has supplied an authoritative account on the subject, although in parts — such as the chapter on 'Training the People' — one feels that a slightly more in depth treatment would have been beneficial.

**Blimp!** by George Larson, published by Van Nostrand Reinhold (128pp illus text incl colour) at **£16.95**

Written by George Larson with photographs by Baron Wolman and George Hall, 'Blimp!' is largely centred around the operations of Goodyear's fleet of four non-rigid craft; although opening chapters give a background to the 'rise and fall' of the great airships of the 1920s and 1930s such as the ill-fated *Hindenburg* and R-101. The Goodyear blimps, one of which (*Europa*) regularly visits the UK from its base near Rome, are primarily flown as a large public relations banner for the company. While their upkeep entails a heavy financial commitment, the Goodyear airships are reckoned nevertheless to be the best-known corporate symbol in America and undoubtedly attract attention wherever they go.

This book is presented in a lively manner, but in places it reads too much like a company promotional brochure and this is particularly apparent in the sections entitled 'The road show' and 'America's sweethearts'. It would have been more useful

if the future of blimps was examined more thoroughly together with the inordinate problems associated with airship operations; both subjects are just touched upon in very little depth.

The outstanding feature of 'Blimp!' is the photographic content and the numerous colour 'plates' give the book a strong visual appeal. This is especially the case in the chapter 'Sailing low' which contains a very artistic series of air-to-ground studies; although even these do not justify the rather sizeable price tag of £16.95!

**Military Aircraft Markings 1982** by Peter R. March, published by Ian Allan Ltd (128pp illus text) at **£1.80**

This military companion to 'Civil Aircraft Markings' is now in its third edition and has already become established as an invaluable guide to all current aircraft carrying service numbers in the British Isles. Arranged in strict alphabetical and numerical order, the list gives information on all UK military aircraft, including those located overseas for operational reasons; USAF and USN machines based in the UK and the current Irish Army Air Corps fleet are also featured. New sections incorporated in this year's edition are 'US based aircraft of the USAF' (serial numbers of machines based in the USA but are likely to visit the UK) and 'Overseas Military Aircraft Markings' (a selection of aircraft belonging to foreign air arms that are likely to be seen visiting UK civil and military airfields on transport flights, exchange visits, exercises and for air shows).

The Northrop F-5Es of the 527th TFTAS are appearing in new colour schemes, for example 74-01548 is now natural metal and 74-01560 is in a 'lizard' camouflage. This reflects the new schemes that have appeared on the aircraft of Warsaw Pact countries. The unit lost 74-01550 when it crashed into the Mediterranean on 25 January.

In Northern Ireland the move of No 72 Squadron with its Wessex HC2s to **RAF Aldergrove**-Belfast was completed at the end of last year. Meanwhile at **RAF Benson** arrangements are being made for the arrival of No 115 Squadron which is due to move in with its Andovers in December. This will rationalise the location of the RAF's small fleet of Andovers as the Queen's Flight has long been based here with its three aircraft.

The markings carried by the Lightnings of Nos 5 and 11 Squadrons at **RAF Binbrook** have continued to change. After toning down which meant the miniaturisation of badges on the camouflaged scheme, two aircraft have now returned from major overhauls at St Athan painted in an overall light grey colour scheme; XR770 was the first to appear, followed by XR757. The rotation of aircraft between the LTF (Lightning Training Flight) and the two squadrons continues as does the movement in and out of store with the ASF (Aircraft Servicing Flight) which has recently been applying red ASF badges to the tails of some aircraft.

A recent departure through **Bournemouth-Hurn** was Beaver AL1 XP824. This aircraft, which had been stored at St Athan and more recently Kemble, was containerised and

destined for the Sultan of Oman Air Force Museum. Flight Refuelling Ltd has been operating Sea Vixen D3 prototype XP924 and XS577, 'TT4' XJ524, and Canberra TT18 WK143 during the early months of this year. Awaiting conversion are Sea Vixen FAW2s XJ580 and XJ608 while XJ602 and XN697 are parked behind the hangars. First flight of the prototype VC10 tanker conversion is expected from **Bristol-Filton** in May. Test crews have been undergoing training with No 241 OCU. After initial company trials the first aircraft will be delivered to **Boscombe Down**. It seems fairly certain now that the VC10 tanker squadron will be based at **RAF Brize Norton** alongside No 10 Squadron's aircraft. The departure of No 115 Squadron to Benson paves the way for this in 1983. The latter squadron has recently introduced a new variant of the Andover E3, officially designated the E3A it features internal equipment changes only. The two aircraft concerned are XS639 and XS643. No 115 Squadron also has on strength E3s XS603, XS605, XS610 and XS640, together with C1s XS596 and XS641.

At **Cambridge Marshalls** continue with considerable C-130 Hercules work as a major sub-contractor to Lockheed. The Hercules C3 modification programme continues with XV183, XV188, XV197, XV202, XV207, XV219, XV220, XV221, XV223, XV290, XV294, XV303 and XV305 through the process to date. Over-

Continued on page 238

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# airview

Peter R. March

## Service round-up

Changes in equipment, allocations of aircraft to units and indeed the existence of squadrons themselves are constantly on the change. Detailed below is the first of a periodic round-up of what is happening on the service scene in the UK. At **RAF Abingdon** preparations appear to be stepping up to take over the tasks of 5 MU at **RAF Kemble** which is to close next year. Hawks are now arriving for overhaul and the reserve stock of aircraft is being held here. The stored ex-British Airways VC10s have now been prepared for a long wait before a decision is taken as to their future; they have been purchased by the MoD against the contingency of a need to enlarge the tanker force of VC10s when the last of the Victors are withdrawn. The RAF Exhibition Flight has added Gazelle HT3 XX396/8718M and the nose of Phantom FG1 XT595/8550M to its fleet. The Battle Damage Repair Flight now has the ex-Cranwell Sea Vixen FAW2 XJ609/8172M, which carries the incorrect number 8171M.

The 10th TRW at **RAF Alconbury** will show the advancing plans for the replacement of the RF-4C Phantoms by new Lockheed TR-1s to be effected next year.

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# Air Defence of the UK

Grp Capt R. A. Mason CBE, MA, RAF

ON AVERAGE, five times a week in 1980, fighters of No 11 Group intercepted Russian aircraft which were probing the British Air Defence Region, usually out over the waters of the northern North Sea or the Eastern Atlantic. The call to 'Scramble' could come at any hour of day or night to the Phantoms or Lightnings kept at a high state of readiness 24 hours a day, seven days a week at the fighter bases in Strike Command.

Within one or two minutes of the call, the 'Quick Reaction Alert' aircraft would be rolling down the runway prior to climbing away through cloud, rain or snow to the transit height en route to an interception point which could be as much as 800 miles off the coast of the United Kingdom. It is a far cry from the blue skies of summer 1940: from the scramble of Spitfires and Hurricanes from grass fields in the south of England against the *Luftwaffe* bomber streams already less than 100 miles away. But although Fighter Command is now No 11 Group, and Merlin engines have given way to Speys and Avons, the fundamental task remains the same: the preservation of the integrity of United Kingdom airspace. Then it was during the war, now it is during peace, but with the added incentive that the more effective the interceptors are seen to be in peacetime, the less likely they are to be called upon to fire their missiles or their guns in anger.

## The Changing Threat

In the early-1950s, the major air threat to the United Kingdom came from the first generation of postwar Soviet jet bombers armed with free-fall conventional or nuclear weapons. The squadrons of Fighter

Command were deployed on many bases round the British coast from Leuchars in the north to Tangmere in the south, very much as they had been 10 years previously in WW2. Then, as NATO strategy was modified to deter or to fight a short nuclear war and as the Soviet Union herself began to deploy surface-to-surface missiles with nuclear warheads, the perception of the threat to the United Kingdom changed accordingly. The Defence White Paper of 1957 asserted that the manned bomber would be superseded by the surface-to-surface missile and there would be no need to replace the Lightning fighter by any other manned interceptor; that there was no defence against missile attack, that our defence posture would be based much more exclusively on the nuclear deterrent power of the V-Force and that, therefore, the role of Fighter Command would be reduced to that of protecting the V-Force bases. This remained the posture throughout the 1960s and into the 1970s.

The Soviet Union, however, saw the strategic environment somewhat differently. She did, indeed, develop her surface-to-surface nuclear-tipped missiles but also continued to introduce new manned bombers capable of in-flight refuelling and equipped with stand-off weapons with both conventional and nuclear warheads. She is now producing some 30 Tu-22M 'Backfire' bombers a year, of which half are entering service with the Soviet Maritime Air Arm and the others with Long Range Aviation, the equivalent of the old RAF Bomber Command. 'Backfire' is believed to be capable of speeds of Mach 2 at height, carries a bombload in excess of 12,000lb or the air-to-surface 'Kitchen' long-range stand-off missile and with in-flight refuelling could attack the United Kingdom from any direc-

tion. In the longer term it could be escorted by either later marks of the MiG-23 'Flogger' interceptor or by the projected longer range two-seat variant of the MiG-25 'Foxbat'.

Nor is 'Backfire' the only threat. Large numbers of Su-24 'Fencer' are entering service with Frontal Aviation at the rate of 50 a year. From their permanent bases in Western Russia, they could reach the United Kingdom on a high-low-high flight profile, but if deployed forward to bases in Eastern Germany, they could significantly increase the threat of larger scale low-level attack on these islands. 'Fencer' carries a weapon system specialist seated alongside the pilot to operate the advanced navigation and attack systems which would allow it to fly at low level at night or in bad weather, with a bombload significantly larger than its shorter range predecessors in the Warsaw Pact Air Forces. So, No 11 Group faces a formidable adversary and, as Soviet aircraft continue to improve their performance, its responsibility will increase.

## UK Air Defence and NATO

Just as in 1940 the fate of Western Europe hung in the balance, so in any future conflict more than just the security of the United Kingdom would be at stake in the struggle for command of the United Kingdom Air Defence Region. Since 1967, the North Atlantic Treaty Organisation has adopted a strategy of 'flexible and appropriate response' to any aggression. The Alliance's primary aim is to deter aggression, but should deterrence fail, then the enemy would be met by a level of military response deemed appropriate at the time. In practice, this has implied a possibility of fighting a conventional phase of warfare to defend allied territory as near to the eastern borders as possible.

But such a strategy is threatened by the in-place numerical superiority of Warsaw Pact troops, tanks, artillery and armoured personnel carriers. Consequently, on warning of imminent aggression, and as quickly as possible after the outbreak of conflict, our land forces in Europe must be rapidly reinforced. A large proportion of those reinforcements would move either from, through or over the United Kingdom. It is, therefore, of critical importance to the Alliance as a whole that our reinforcement routes, harbours, airfields, railheads and concentration areas be kept free from enemy air

attack. If he were to succeed in isolating the conflict area of his choice from its major reinforcements, his local superiority could be overwhelming. This explains the heavy responsibility underlying the tasks allocated to the various components of No 11 Group in the 1980s.

## The Aircraft

The peacetime interceptions are made by the seven fighter squadrons of the Group: all bearing famous numbers and proud traditions. Guarding the northern flank and the eastern Atlantic sea routes are the Phantom FG1s of No 43 Squadron: the 'Fighting Cocks'. No 43 has a particular commitment to the air defence of maritime forces in addition to the broader responsibility to United Kingdom airspace. In addition to distinguished service in both world wars, the Squadron has a long association with Scotland, being formed at Stirling in 1916. Sharing the airfield at RAF Leuchars is No 111 Squadron, known familiarly as the 'Tremblers'. In 1979 No 111 maintained the standards which had allowed it to claim 94 enemy aircraft destroyed during the Battle of Britain when it won the first Royal Air Force fighter competition for the 'Seed' air-to-air gunnery trophy with score in excess of 25% after a 'shoot-out' over towed banner targets. 'Treble-One', like all the other RAF Phantom squadrons except '43', flies the FGR2 or F-4M model which may be armed with four air-to-air Sidewinder heat-seeking missiles and four Sparrow radar-guided longer range missiles as well as a six barrelled General Electric M-61 gun. The FGR2 has an effective unrefuelled combat radius of some 500 miles with a top speed in excess of Mach 2 at height and over Mach 1 at low level, where its pulse doppler radar aids detection and attack.

Also equipped with FGR2s are No 29 Squadron and No 228 OCU at Coningsby and, guarding East Anglia and the approaches to the Home Counties are No 23 and No 56 Squadrons at Wattisham. Both No 29 and No 23 have been in the night and all-weather fighter game since flying Blenheims at the outbreak of WW2. No 56, on the other hand, has always hitherto been a day fighter squadron, including among its WW1 aircrew, Victoria Cross winners Albert Ball and J. B. McCudden, and subsequently playing a prominent part in the Battle of Britain.

The other two squadrons, based at Binbrook in Lincolnshire, are No 5 and No 11 Lightning Squadrons which share the task of the Southern Quick Reaction Alert Force with the Wattisham Phantoms. No 5 Squadron forced down the first enemy aircraft of WW1 on 24 August 1914, while No 11 has had a varied record of service reverting in 1948 to its original fighter role. The Lightning has now seen 20 years' service and it remains a formidable interceptor. Both squadrons operate a mix of F3 and F6 models and the latter is capable of speeds in excess of Mach 2. It is equipped with a long range search radar and Red Top missiles which can attack from any angle. For closer range operations it carries two



30mm cannon. Originally designed for high-level operating, the Lightning continues to prove its versatility by intercepting targets at all altitudes and continues to capitalise on its very high speed and high rate of climb.

## Peacetime Preparedness

The level of combat effectiveness achieved by the interceptors of No 11 Group is the product of hard training and a great deal of teamwork. Day to day training will include practice interceptions which will steadily increase in complexity against targets flying at different heights and speeds, sometimes evading, sometimes not, and sometimes against a background of electronic counter-measures. In the Phantom Squadrons, teamwork begins with pilot and navigator: the latter not only contributing to the overall lookout but operating the aircraft's own target radar which in the event of heavy enemy jamming of the ground radar station could allow the interception still to be carried out. All the fighter squadrons are likely to spend a great deal of time well away from land in a potentially hostile environment, frequently at low level, and they have not only to locate and intercept a target but also navigate back to base. Nor is the weather of the North Sea and the Iceland-Faroes Gap conducive to visual navigation.

The crews, however, are not always on their own. They work as part of a broader team which includes airborne early-warning aircraft, in-flight refuelling aircraft, ground radar and control stations and, for those intruders who penetrate to closer range, air-to-ground defences.

By 1972, the low-level threat to the United Kingdom was becoming apparent. Existing ground radar stations provided good medium and high level cover but below that there were gaps. Consequently, No 8 Squadron, itself possessing a famous fighter ground-attack history in both world wars and thereafter was reformed with Shackleton AEW2 aircraft, converted from the maritime reconnaissance role as they were replaced by the Nimrod. At its base at Lossiemouth in Northern Scotland, No 8 Squadron also mounts a Quick Reaction Alert, in harness with its faster interceptor team-mates. On receipt of the news that a 'bear' is on its way

Above: Representatives of the Lightning Wing from RAF Binbrook; a T5 from the Lightning Training Flight leads F6s from No 5 Squadron (port) and No 11 Squadron. Although destined to be replaced by the Tornado F2, the Lightning is still a potent Mach 2 interceptor whose weapons 'fit' includes the Red Top infra-red guided AAM.

from its lair in the Kola peninsula the QRA Shackleton is scrambled with an alacrity that belies its years of service. The endurance that was provided originally to allow it to patrol for 10 hours or more over the Atlantic now permits it to remain on station for several hours working with the interceptor crews, the sustaining tankers and the ground control unit, providing warning of low-level intrusion far earlier than would be achieved by the ground unit itself and, when required, contributing to the actual control of the interceptors themselves.

The third element in the team is the visitor from 1 Group, the Victor K2 tanker from either No 55 or No 57 Squadron at Royal Air Force Marham. The tanker squadrons provide, by in-flight refuelling, vital extra range for several types of air operation. They permit the fighters to mount air patrols, known as 'Combat Air Patrols', several hundred miles off the British coast thereby making interception possible before the attacking bomber has reached its own air-to-surface missile release point. In peacetime, they help the Phantom and Lightning to intercept and shadow the prowling 'Bear' well before he reaches British airspace, thereby emphasising how difficult his task would be in war. Under normal circumstances, the team of interceptors, airborne early warning and tanker aircraft would operate under the direction of the ground control organisation within the United Kingdom Air Defence ground environment. This organisation includes surveillance radar stations, the ballistic missile early warning station at Fylingdales, communication systems, sector operation centres and the United Kingdom regional Air Operations Centre at West Drayton near London. Fylingdales is unique in the United Kingdom system in that its primary responsibility is not to provide early warning of Soviet aircraft but of the launching of inter-continental



Left: An RAF Phantom of No 111 Squadron armed with Sidewinder missiles, intercepts a Soviet maritime reconnaissance Tu-95 'Bear-D' over the North Sea in 1980.

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AIRCRAFT ILLUSTRATED





Top: Phantom FGR2s of No 56 Squadron from RAF Wattisham sweep low over the Ballistic Early Warning System at Fylingdales in North Yorkshire.

Above: Teamwork at RAF Leuchars — two Phantoms of No 111 Squadron scramble to look at an unidentified 'intruder', while RAF Regiment airmen in anti-nuclear, biological and chemical (NBC) protective clothing prepare to defend the station with Rapier.

ballistic missiles. It has a direct communication link with the North American Air Defence Centre at Colorado Springs as well as to No 11 Group Headquarters and to Strike Command Headquarters. Although, happily, Fylingdales has not yet had to track any missile, it does keep a close eye on some 1,200 satellites each week.

tion time will be reduced by modern automatic data processing and the whole system will be designed to cope with the maximum expected target and air defence resource activities. Interoperability with other NATO and national systems will be assured.

#### Surface-to-air Defences

Should any aircraft penetrate this air defence team they would meet the short-range air-to-ground missile units of the Rapier and Bloodhound missile squadrons.

Rapier has been in operation with RAF Regiment squadrons of No 38 Group since 1974. It is a short-range, highly effective low-level rapid reaction weapon which is guided either optically or by radar. Although normally deployed for point protection such as airfields it is highly mobile, each unit requiring only three Land Rovers. Each launcher carries four missiles powered by a two-stage solid fuel motor. Surveillance radar, together with IFF, provides early detection and identification of approaching aircraft. Typical of such a squadron is No 27 Rapier Squadron Royal Air Force Regiment, equipped with the Blindfire target acquisition system which provides 24-hour air-to-surface defence at RAF Leuchars. In 1981, the United States Government announced that it intended to purchase Rapier to defend USAF bases in the United Kingdom. The concentration of effort will obviously be against air attacks on those airfields but the air defence net, as a whole, will be proportionately strengthened. In due course, Rapier will be further improved by a computer modification and a new radar capable of tracking several targets simultaneously.

Bloodhound 2 is an older weapon, entering service in 1964 but is still an effective medium and low-level system with well proven electronic countermeasure features. It is powered by four solid propellant motors and homes on to targets illuminated by a ground target radar. Its high explosive warhead has a proximity fuse and its operating range is in excess of 80 miles at heights from 100ft to more than 60,000ft. In 1982, the Bloodhound units at present located at Laarbruch, Bruggen and Wildenrath will be transferred to the United Kingdom for deployment in Lincolnshire and East Anglia.

#### Intensified Training

This defensive blend of interceptors and missiles must be effectively co-ordinated. 'Routine' training, therefore, involves all-weather practice interceptions, QRA, working with the Shackletons, in-flight refuelling, mastering procedures with the surface-to-air missile squadrons, flying almost instinctively with ground control and confidently without it. Indeed, such training can scarcely be called 'routine', yet compared to other activities, it may well seem to be so to the fighter crews.

For several years now the USAF has maintained an 'Aggressor' Squadron of F-5s at RAF Alconbury whose task is to provide 'dissimilar' combat training to USAF and RAF fighter crews. Obviously, when the majority of peacetime RAF 'interceptions' are made against friendly Phantoms, there

are the obvious dangers of combat parameters becoming determined by the similarity of the aircraft themselves. The lightweight F-5, however, can be flown in very different patterns thereby greatly extending the range of threats to which the RAF crews can become accustomed. Inevitably, keen but good-humoured Allied rivalry gives added spice to the encounters.

A further diversion occurs when the squadrons move away to overseas bases for additional training of competitions. The Mediterranean, for example, might not always present the operational challenges of the North Sea environment but there are obvious compensations in the guaranteed clear weather for those exercises which depend on visual target acquisition and clear air manoeuvres. In October 1980, Grp Capt Alan Parkes, Station Commander at Akrotiri in Cyprus, explained how his unit provided facilities for the squadrons of No 11 Group:

'We are busy for some 10 months of the year with these Armament Practice Camps. Each squadron comes here for about five weeks and carries out its annual training with live gunfire. The target-towing aircraft are Canberras of No 100 Squadron. Each fighter pilot flies a number of cine-camera sorties until he has demonstrated that he can consistently achieve the required safety parameters of range and angle-off, chasing the Canberra towing a target banner on a 300-yard rope. The Squadron Weapons Instructor then tests the pilot firing live 30mm shells against the banner. The pilot then flies six academic shoots in order to gain Allied Common Europe qualifications. This qualification is a percentage score based on hits made against rounds fired and the standard, laid down by Supreme Headquarters Allied Powers Europe, is common to all NATO Air Forces.'

Closer to home, regular missile-firing practice takes place at ranges off North Wales and North Eastern Scotland while squadron exchanges with NATO allies encourage both competition and an awareness of common procedures and objectives.

The most realistic training of all, however, occurs when the entire station assumes that actual conflict has started and, under the eagle eyes of Allied Staff Officers, the squadrons demonstrate how effectively they can operate under simulated wartime conditions. Such conditions may be applied to one station only, which is called a 'Tactical Evaluation' or TACEVAL for short, or it may be part of an 11 Group or even a NATO-wide defence exercise as in 'Elder Forest' in 1980.

TACEVAL is the test by SACEUR of a station's ability to move swiftly from peacetime conditions to war and of its capacity to fight it. The Evaluation Team will simulate just about every incident that could disrupt the Air Defence task. Aircraft will be

declared destroyed on the ground, runways will be obstructed, fuel installations fired, the Station Commander or any combination of his deputies 'killed', a chemical attack received, all communications jammed; and yet the fighters must get airborne and the interceptions made. At the end of the exercise, the performance of the squadrons will be assessed and it is a considerable source of pride among units of No 11 Group, as indeed elsewhere in the Royal Air Force, that standards achieved are consistently well above the NATO average.

If the station is participating in a broader NATO exercise, more offensive and defensive resources of the Alliance will be drawn upon. Such was the case in April 1980 when, for three days, No 11 Group was subjected to repeated attacks by aircraft from the United States, German, Canadian, Netherlands, Norwegian, Belgian and French Air Forces. The Lightnings and Phantoms of the seven fighter squadrons were supplemented, as they would be in actual conflict, by the aircraft of the Lightning Training Flight at Binbrook, the Phantoms of No 228 OCU at Coningsby and the Hawks and Hunters from the Tactical Weapons Units at Brawdy and Lossiemouth. Alliance solidarity was confirmed by the commitment to the defence of the United Kingdom by USAF F-15s and F-5s which reflected their likely wartime roles. Altogether, some 100 aircraft defended United Kingdom airspace against 300 aggressors. On the ground, air bases were defended by the RAF Regiment against 'diversionary brigades' or 'saboteurs', the Royal Observer Corps was deployed and Bloodhound and Rapier units were exercised.

Royal Air Force Wattisham was opened to the national press for the third day of the exercise, which began with a low-level attack by six *Luftwaffe* F-4K Phantoms, followed quickly by four F-104 Starfighters of the Canadian Armed Forces. Synchronised with the attacks, ground explosions were detonated and the passive defence units of

the station has to cope with fires and 'casualties' while full operational response was being maintained by the squadrons. A more sinister attack was made by a lone aggressor Hunter which, in a single high-speed low-level pass, simulated a chemical attack but, thoroughly drilled in many station exercises, all ground personnel had already donned their nuclear biological and chemical dress and still the Phantoms of Nos 56 and 23 Squadrons continued to get airborne. Finally, by the end of one 36-hour period the two squadrons alone had made almost 200 interceptions. As AVM Peter Latham, AOC No 11 Group observed, 'Most excellent. Britain's air defence is the very best we can do with our resources. We have a highly skilled force with very good equipment.'

#### The Future

The offensive capability, however, of the Warsaw Pact Air Forces continues to grow. So, in addition to the improvements in hand for the ground environment of the UK Air Defence, so the other equipment in the active defence must also be progressively strengthened. At the centre of the re-equipment programme is the Panavia Tornado F2: the Air Defence Variant of the international multi-role combat aircraft already entering RAF service in its interdiction strike (IDS) role. 165 Tornado F2s will ultimately replace all the RAF's Phantoms and Lightnings both in the United Kingdom and in RAF Germany. Full-scale development of the F2 was authorised by the British government in March 1976, and by the end of 1980 three prototypes were flying. It is scheduled to enter service in 1984.

A reminder of the likely air defence operational environment in the next generation serves to emphasise just how important the F2 will be. The United Kingdom could be threatened from many directions by large numbers of enemy aircraft in a short space of time. They could seek to penetrate at low or medium level, at high or supersonic



Right: A Canberra of No 100 Squadron at RAF Marham, Norfolk is prepared for another practice sortie for Lightnings and Phantoms over the North Sea.



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Above: The first prototype of the Tornado F2 Air Defence Variant, fitted with four semi-recessed Sky Flash missiles under the fuselage, carrying out in-flight refuelling trials from Victor K2, XL512, of No 57 Squadron. With tanker support the Tornado is designed to have a loiter time of several hours.

Photo: BAe Warton

speeds and could carry free-fall or stand-off weapons. They would very likely be accompanied by comprehensive electronic countermeasure (ECM) support. Moreover, a proportion might get through to damage our airfields. The F2 will, therefore, be called upon to operate for extended periods on combat patrols over an area stretching from the North Eastern Atlantic, across the North Sea to the mouth of the Baltic, down to the English Channel and, in addition, to contribute towards the air defence of the Central Region of Europe. In those areas, it will not only be protecting approaches to the United Kingdom, but covering Allied maritime forces below it. Finally, it must be able to get airborne from damaged runways.

The production model F2 will be powered by uprated RB199-34R-04 turbo-fan engines at present installed in the IDS Tornado. Each possesses about 8,000lb static thrust raised to 15,000lb with reheat. Its fuselage is slightly larger than the IDS to accommodate the nose radome and four Sky Flash missiles. However, the extension has provided additional space for avionics and fuel as well as permitting further improvements to aerodynamic performance. Its basic operation radius of 400 miles will be extended by in-flight refuelling and its supersonic acceleration will be superior to that of the IDS.

As well as the four Sky Flash air-to-air guided missiles, F2 will carry four Raytheon AIM-9L Sidewinders on underwing pylons and a Mauser 27mm cannon recessed in the starboard fuselage. An integral part of the complete weapon system is the new Marconi airborne interceptor radar named Foxhunter. The radar operates in the 3cm 1b band and uses pulse doppler techniques described by Marconi as Frequency Modulated Intermittent Continuous Wave. It carries a wide range of electronic countermeasure features and can track a number of targets simultaneously at a detection range in excess of 100 miles. The Sky Flash missile, itself, will be able to engage targets at a distance of 25 miles at very low level and can both discriminate between closely bunched targets and isolate them from background earth clutter.

Tactical implications of the F2's advanced equipment are considerable. The integration of the aircraft's weapons management and information display systems will permit the crew to respond to directions from the airborne early warning aircraft or the ground without speech transmissions and, because of their full awareness of their immediate tactical environment, to act independently of any external control if circumstances should demand it. As long as external communications do remain open, the aircraft will be able to receive real-time information on unidentified aircraft and jamming sources which will permit the swiftest and most economic allocation of fighter resources where they are most needed. Thus, the highest degree of centralised guidance may be safely and simply co-ordinated with a considerable amount of autonomous operation.

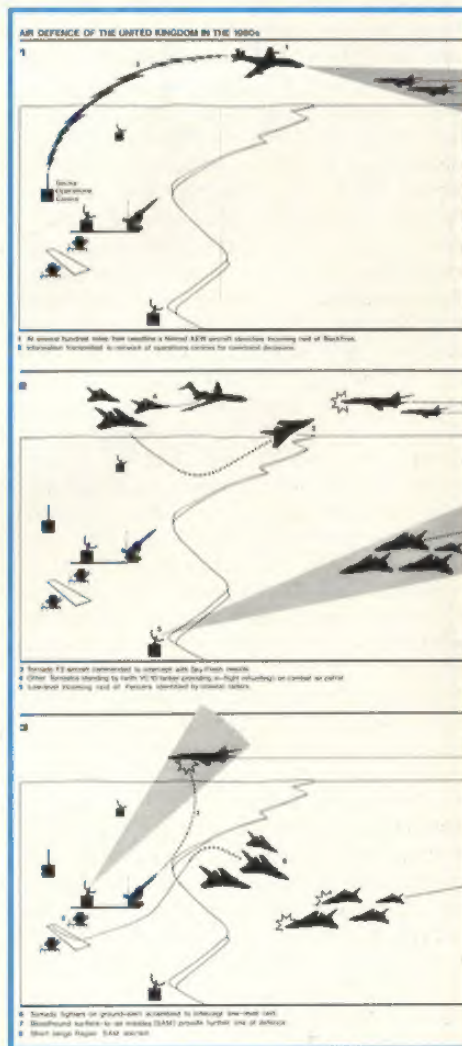
The ability to identify enemy aircraft in time to derive the greatest benefit from the weapons systems will be helped not just by the data links with other units in the defence organisation, but by equipment carried by the F2 itself. The IFF interrogator will be valuable, but like any other IFF system will be vulnerable to spoofing and other electronic countermeasures in war. Until ECM resistant equipment is designed, further reliance will be placed on a visual augmentation system which is a low light TV camera to allow clear air identification by day and night. In addition, the Radar Homing and Warning Receiver is primarily designed to give the crew visual and audio warning of imminent threats. This equipment, however, will obviously assist identification by distinguishing between signals emitted by hostile and friendly radars.

The final advantage, shared by F2 with the GR1, is its ability to operate with full weapon and fuel load from less than 1,000yd of concrete. With its integral auxiliary power unit and on-board unserviceability identification and diagnosis systems and secure, comprehensive communications net, F2 can be dispersed well away from its home base provided it has access to fuel, weapons and groundcrew. Indeed, the advent of F2 into No 11 Group will present a challenge to the imagination of its operators to ensure that the aircraft's enormous potential is fully realised.

In time of tension another, less spectacular but very effective dispersal would take place to strengthen the United Kingdom's air

defences. The decision was made in 1979 to modify 85 Hawk training aircraft to carry the AIM-9L Sidewinder. The Hawk is a small single-engined multi-purpose transonic trainer whose primary role at RAF Chivenor and RAF Brawdy is to convert fast jet pilots from basic flying training to their ultimate operational tasks. It has a maximum speed of Mach 0.88 in level flight and Mach 1.2 in a shallow dive and it can carry up to 6,500lb of weapons including Sidewinders. Although restricted to clear air operations, when dispersed to airfields throughout the United Kingdom, the highly manoeuvrable Hawk will provide a valuable short-range addition to local air defences and will obviously complicate the task of any enemy aircraft which might penetrate the Tornado screen.

In the longer term, just as the AIM-9L has replaced earlier Marks of Sidewinder, so Sky Flash will be replaced by a new international collaborative radar-guided medium range air-to-air weapon and Sidewinder itself, by a short range heat-seeking weapon. It is envisaged that the North Atlantic Treaty Alliance will collaborate on procuring both weapons, with the United States taking the lead in the longer range equipment and a European consortium, including the United Kingdom, being responsible for the infra-red weapon. By the 1990s, it can be expected that the medium range missile will have a reliable IFF interrogator, a low vulnerability to ECM by deception or jamming and will be able to destroy small low flying targets at



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Above: Shackleton AEW2, WR960, of No 8 Squadron stationed at Lossiemouth. The Shackleton is to be replaced in the Airborne Early Warning role by the new Nimrod AEW3, the first of which is scheduled to enter service this year. Photo: Denis J. Calvert/Inter-Air Press

considerable range. The short range weapon is likely to be extremely agile, resistant to flare deception and because of its sensitivity to temperature variation, able to attack an aircraft from any angle.

#### Airborne Early Warning

But, however good the fighter aircraft and however deadly their weapons, enemy intruders are not only likely to have the advantage of tactical surprise, but they will have a lot of airspace in which to seek concealment. Consequently, the entry into service in 1982 of the Nimrod Airborne Early Warning aircraft to replace the venerable Shackleton will be of enormous significance to the United Kingdom air defence. The British Government had originally intended to join with NATO in an Alliance purchase of a number of United States E-3 Sentry Airborne Warning and Control System (AWACS) aircraft but lengthy delays in the ability of the Allies to agree the conditions of such a purchase led to the British decision in March 1977 to develop the Nimrod airframe and engines as a national AEW aircraft. It was believed that any further delay in preparing the replacement for the Shackleton would leave a serious gap in the United Kingdom air defence system. The first Service Nimrod AEW is expected to reach its designated base at Waddington in 1982 with the squadron numbers completed by 1985.

It is readily distinguishable from its maritime predecessors by the bulbous radomes mounted on the nose and tail. In wing-tip pods it carries electronic support measures equipment. Not surprisingly, Nimrod AEW has been described as 'a flying radar station'. Two Ferranti FIN-1012 inertial navigation platforms provide the information about the aircraft's own position, heading and attitude which must be absolutely accurate so that the rest of the system may be reliable. Its function is to complement ground-based radars by extending coverage much further away from the United Kingdom's coastline and to much lower levels. Nimrod will provide early warning information to the air defence network and should ground control units be eliminated from the conflict, it could control

fighters directly itself. Unlike AWACS, however, it is not designed to provide an alternative airborne control post for offensive operations.

The aircraft will use three methods to detect and clarify targets. First, is the pulse doppler radar which operates in two modes: high pulse repetition frequency for tracking fast moving targets and a lower range which would identify slow moving objects such as ships. The radar's extensive electronic counter countermeasures protection will be enhanced by frequency agility. The second method of detection is the IFF Interrogator which is co-ordinated with the radar response reception and the third, the electronic support measure equipment which automatically compares emissions received with those stored in its memory bank. Communication with other elements in the air defence ground environment, AWACS and Royal Navy ships will initially be by NATO data link 11 and, subsequently, by the spectrum, highly secure joint tactical information distribution system (JTIDS). The advent of Nimrod AEW will therefore make undetected low level intrusion of UK airspace a very difficult proposition for many years ahead.

#### The New Team

In addition, the ability of Tornado to take advantage of the longer range activities of Nimrod AEW will be further enhanced by expansion of the RAF's in-flight refuelling fleet. To the 23 Victor K2s will be added the nine VC 10s purchased in 1978 and due to enter service at Brize Norton between 1982 and 1983.

Defence policy decisions of the 1950s which alleged that there would be little further threat to the United Kingdom from the manned bomber, and that consequently there was no need to build an interceptor successor to the Lightning has been proved by the Warsaw Pact Air Forces to be premature. It was, however, much easier to run defences down than to reconstruct them and it is only in the 1980s that the country can look to a major strengthening of all aspects of United Kingdom air defence with the advent of Tornado F2, new weapons, a new ground environment, the Nimrod AEW, the VC 10 tankers and steadily increasing surface-to-air missile defences. It will not be forgotten that all other military operations must depend in the last resort on the security of the home base which is the ultimate responsibility of the air defence system of the United Kingdom.

Reprinted from 'The Royal Air Force — Today and Tomorrow' by Grp Capt R. A. Mason, to be published by Ian Allan Ltd on 20 April 1982

Right: The new team — from 1984 onwards the air defence of the UK will be enhanced by the partnership of the Tornado F2 and the Nimrod AEW3. The AEW variant of the Nimrod can provide at long range and at low or high altitude, detection, tracking and classification of aircraft, missiles and ships as well as interceptor control, direction of strike aircraft, air traffic control and SAR facilities.

Below: Panavia Tornado ADV prototype AO2, fires a BAe Dynamics Sky Flash medium-range air-to-air missile. As well as the four Sky Flash missiles, the F2 will carry four Raytheon AIM-9L Sidewinders on underwing pylons and a Mauser 27mm cannon recessed in the starboard fuselage. Photos: BAe Warton







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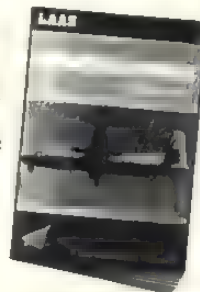


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## The Hornet starts to swarm

Photographs by McDonnell Douglas

WITH the build-up of F-18 Hornets now steadily progressing towards its entry into frontline service in late-1982, the strike

fighter is beginning to notch-up some notable achievements.

By 11 March 1982 more than 7,500hr had been flown in over 5,000 flights and 27 aircraft had been delivered by McDonnell Douglas in a planned 1,366 aircraft



programme for the US Navy and Marine Corps. Development testing of the Hornet is nearing completion at the Naval Air Test Center at Patuxent River, Md and VFA-125 — the Hornet Training Squadron based at NAS Lemoore, Ca — will begin training fleet pilots and maintenance personnel this summer; the unit plans to operate up to 60 F-18s at the peak of training. Nine F-18s from VFA-125 recently exceeded their flight schedules by 13% during a 23-day deployment to MCAS Yuma, Az. The aircraft flew air combat manoeuvring exercises and the original flight schedule of 288 missions was increased to 326 as fly-rates proved to be higher than expected. 'The Evaluators' of VX-4 Squadron at NAS Point Mugu, Ca are preparing to fly the fighter portion of the F-18A's operational evaluation while VX-5 Squadron at Naval Weapons Center China Lake, Ca will fly the attack section of these tests.

Production of the first of Canada's 138 CF-18 Hornets is under way in St Louis with the initial delivery scheduled for October 1982. Australia will receive its first of 75 Hornets in late-1984.

Above: Four US Navy Hornets of VF-125 photographed during a training mission from NAS Lemoore, Ca. The aircraft, two single-seat F-18As and two TF-18A dual control trainers, are finished in the three-tone grey colour scheme.

Above left: F-18A, BuAer No 161214, of VX-4 'the Evaluators' equipped with wingtip mounted Sidewinders and two Sparrows on the fuselage stations.

Left: F-18 development aircraft No 3 undergoing carrier trials; note the folded wingtips that aid the aircraft's manoeuvrability around a crowded flightdeck. Although the Hornets that now roll-off the McDonnell Douglas assembly line leave St Louis in the three-tone grey paint scheme, several 'blue and white' development models are still working at the Naval Air Test Center.



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# F-18 Hornet — from development...



Above: A development F-18 Hornet with a payload of four bombs and two wingtip-mounted Sidewinders during an evaluation flight from the US Naval Air Test Center at Patuxent River, Md. Note the empty nacelle fuselage stations that normally accommodate Sparrow missiles.

Below: F-18 Hornet, BuAer No 161250, of the US Navy Hornet Training Squadron (VFA-125) makes a high-speed pass over the desert near its base at NAS Lemoore, Ca. Fleet training by VFA-125 is scheduled to begin later this year. *Photo: McDonnell/Douglas*

...into service





James Goulding

## The first Mirage 2000

The honour of producing the first kit of the Mirage 2000 delta-winged fighter has gone to ESCI, and it would indeed be difficult to improve upon this 1:48 scale model.

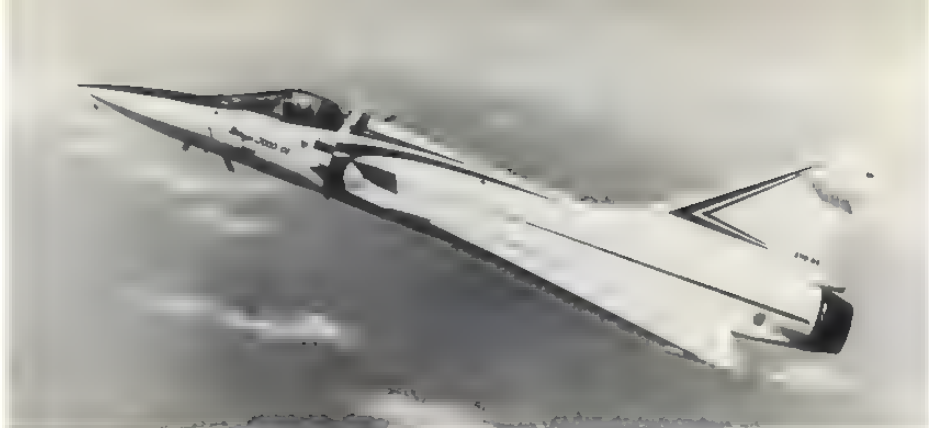
When the long-awaited Mirage 2000 eventually emerged from the Dassault-Breguet works, it came as a surprise that this new generation of Mirage fighters had reverted to a simple, pure delta wing design; instead of using a conventional swept wing, a tailed delta or a more sophisticated canard layout. The original Mirage deltas have been very successful, but the pure delta wing layout does suffer from disadvantages in airfield performance.

The delta wing reaches maximum lift at very high angles of incidence, and these are often beyond the angle at which the aircraft can land. The Fairey FD-2 research delta and Concorde use the drooping nose system to utilise the extra lift available at high landing attitudes and yet provide a good view for the pilot. This permits lower landing speeds and shorter landing runs, but the extra weight of the drooping nose mechanism would be a disadvantage to a fighter aircraft, in which the power:weight ratio is very important. To give a good view for landing, the pure tailless delta has to approach at only moderate wing incidence and, because the delta wing does not provide as much lift as a moderately swept wing in this attitude, the landing is fast and long. The Mirage 2000 has a wing which is simpler in form than that used on the Mirage III, which has conical camber along the leading edge. The '2000' wing, however, is fully slatted.

The inherent disadvantages of the pure delta are largely overcome by the 'fly by wire' flying control system of the '2000' and by keeping the all-up weight to a minimum by the use of composite materials in the structure. Time alone will tell if this new fighter can perform as well as conventional shapes like the F-16 and F-18, or some of the sophisticated new fighter layouts being proposed.

The ESCI kit of this elegant fighter is fortunately up to the very highest standards of the model makers art. The overall accuracy of shape, excellent detail and general high quality make this a quite exceptional kit. The fit of parts makes filling of joints virtually unnecessary and it seems likely that this model is the work of the same pattern and tool maker who was responsible for the superb ESCI Phantoms and Mirage F1. Surface engraving is in the form of indented lines and panels, so beautifully produced that one would like to know just what technique was employed. The merged fuselage/wing intersection is a prominent feature of the Mirage 2000 design and this is nicely contoured in the model.

The cockpit components, particularly the ejection seat, are well modelled, but



Above: The first Mirage 2000 prototype to fly, 01, is the subject of a new 1:48 scale kit manufactured by ESCI; the initial model to be produced of this slender delta-winged fighter. Photo: Dassault-Breguet

personally I would have preferred to see engraved instruments and switches on the panels on a model of this size, instead of the decals supplied. All smaller parts, such as undercarriage legs and wheels, have good detail. A large fuel tank is mounted on the aircraft centre line and there are four pylons under the wings. The inner pylons have large air-to-air missiles, while the outer pylons hold Magic AAMs.

The decal sheet gives markings for the first prototype.

Our sample of the ESCI Mirage 2000 was kindly supplied by Humbrol Limited and costs £3.65.

## Two superb Phantoms

Most of the major kit manufacturers throughout the world have models (in various scales) of the McDonnell Douglas F-4 Phantom II in their ranges. The models have varied between 1:32 and 1:144 scales, and all of the generally-used versions of this versatile fighter-bomber have now been covered. As with other aircraft that have proved to be favourite subjects with manufacturers and where large numbers of kits have been produced, the quality and accuracy of the models has been variable.

Although the giant 1:32 scale Phantoms are excellent models, it is the 1:48 scale that has offered the most consistently accurate and high quality kits of all those available. 1:72 scale has generally been less well served, with few really satisfying models. In the latter range there seem to be a number of kits with defects of one sort or another, that require alteration before the replica can be truly satisfactory. Some of them were early attempts at producing Phantom models in order to get ahead of the rest of the field, with detrimental effect on accuracy. A number had wings that were too thin, undercarriages that were too high or canopies that were too bulbous. Others were outdated by design changes.

After some rather inaccurate early kits, Hasegawa produced a model of the F-4E which for some years was the best 1:72 scale kit of the Phantom available; recently this has been updated to incorporate the new revised, slatted wing.

Now, a really superb 1:72 scale kit of the Phantom has been marketed by Italeri,

together with a similar kit in 1:48 scale by the same company. Both of the models, which share the same box artwork, give parts to build either a late series F-4F (or revised F-4E) or the F-4G 'Wild Weasel' defence suppression aircraft. These models include the new slatted wing that was originally developed to meet a *Luftwaffe* requirement for a smaller turning circle for the Phantom. However, a similar USAF requirement came from combat experience in Vietnam and consequently most of the early production slatted wing-sets were used to retrospectively fit existing USAF F-4Es, the *Luftwaffe*'s F-4Fs following afterwards.

The outline shape of Italeri's F-4F/G is very convincing, having all the character of the big aeroplane, and this includes the canopy, which has always proved to be difficult for manufacturers to accurately portray. Within the restrictions of 1:72 scale size, the cockpit has good detail, the ejection seats being particularly pleasing. Decals are provided for the instrument panels and side consoles. The canopy and windscreen assembly is in four parts, which is helpful to those modellers wishing to show the front and rear canopies open.

Alternative components are supplied to construct the model as the F-4F fighter or F-4G 'Wild Weasel' aircraft. The F-4F has the shorter undernose fairing for the 20mm Vulcan gun, whereas the F-4G has an extended housing for the AN/APR-38 radar warning system. The F-4G also has a bulged antenna atop the tailfin.

As on the Hasegawa F-4E, the slats on the outer wings are well modelled, with a good representation of the operating mechanism. The large under-fuselage fuel tank is carried by both versions, as are the additional tanks carried on the wing outer pylons. The wing inner pylons on the F-4F/E carry pairs of AIM-9 Sidewinders, but the Sparrow missiles are not included. However, these are easily available from many other kits.

The F-4G carries an AGM-48 missile on the starboard under-wing inner pylon and an AGM-78 missile on the port inner pylon. An ALQ-119 ECM pod is carried in the position normally occupied by a Sparrow in the front port-side recess.

Surface detail on the model is in the form of light raised lines, and there is good moulding on the undercarriage legs and doors.

A high quality decal sheet gives markings for a *Luftwaffe* F-4F in experimental camouflage and a USAF F-4G of the 39th TFS, 35th TFW. An excellent chart in colour to assist with painting the camouflage

schemes and markings is printed on the back of the box. One criticism is that the paint shade numbers are not given. The USAF F-4G is in the standard FS34079/FS34102/FS30219/FS36622 colours. The German scheme was one of the experimental colour combinations tried out to evolve a more effective camouflage finish.

The Italeri 1:48 scale kit of the Phantom in its F-4F/modified E or F-4G forms, is closely related to the superb Italeri RF-4 already available. A number of the components are common to both models including the cockpit parts, tailplanes, canopies and windscreen, wing pylons, undercarriage legs, doors and wheels, jet pipe assemblies, and long-range tanks. The main fuselage is also closely allied to the RF-4 component, but the front part of the fuselage of the latter is more angular to match the flattened areas of the camera-equipped nose. Italeri's response has been to use most of the existing fuselage, but to cut-away the lower front section and to supply a new component with contours to match the fighter shape. A new forward fuselage section and nose radome complete the basic F-4E/F and G shape. Alternative undernose fairings are included in the kit. The F-4F and G alternative components and weapons, mirror those supplied in the 1:72 scale kit.

One major difference in the wings of the two kits reflects the increased detail of 1:48 scale. Whereas the slats and mechanism are integrally moulded in the 1:72 scale wings, in the larger model the slats are separate components, and the operating mechanism blister fairings of the inner slats are also separate parts.

The four wing pylons are common to the F-4F/E and G, and a centre-line tank and two wing tanks also apply to all variants.

The Italeri 1:48 scale RF-4 kit has already been reviewed in this column and my comments on it apply equally to the new release

Below: One of the Phantom variants that can be modelled from Italeri's new 1:72 and 1:48 scale kits is the F-4G 'Wild Weasel' defence suppression aircraft. The 'G' is distinguished by its extended undernose fairing housing the AN/APR-38 radar warning system and the bulged antenna atop the tailfin. This aircraft, 69-7204, belongs to the 81st TFS, 52nd TFW, based at Spangdahlem AB, West Germany. Photo: Chris Buck



— that it is a very fine model, with excellent detail and high quality engraving.

A splendid transfer (decal) sheet gives markings for three Phantoms. One is a *Luftwaffe* F-4F of JBG36. Another is an F-4G 'Wild Weasel' of the 563rd TFS, 35th TFW and the third is another USAF F-4G, this time from the 90th TFS, 3rd TFW. Beside the national and unit markings, there are numerous stencilled instruction and warning panels. The sheet is beautifully printed and even the smallest instructions can be read under a magnifying lens. The instruction leaflet has clear informative markings drawings, and here the Federal Standards paint numbers are given.

The 1:72 scale kit costs £1.72 and the 1:48 scale equivalent is £3.54.

## The Italeri F-18

The McDonnell Douglas F-18 Hornet is currently one of the most favoured aircraft types as far as the kit manufacturers are concerned and it is tempting to react with an air of indifference to each new F-18 model produced. One new kit that does deserve attention, though, is Italeri's recently released 1:72 scale kit. This gives modellers the chance to produce the first two-seat Hornet as it can be assembled either as the single-seat or two-seat version. The result is a splendid replica of this twin-engined naval fighter.

The general outline is accurate and surface engraving is delicate. The cockpit in both versions has good detail, and the undercarriage units much enhance the appearance of the model. 'Closed' or 'open' jet pipes are included in the kit. Four pylons are installed under the wings and these mount long-range tanks on the inner positions and twin-bomb carriers outboard. Sidewinders are fitted on wingtip rails and a Sparrow air-to-air missile is carried on each side of the fuselage, on special faired racks.

Markings are given for two development Hornets. One is an F-18A, No 3 aircraft, and the other is a TF-18A two-seater, No 7 aircraft. These are in the white, blue and gold colour scheme.

The Italeri 1:72 scale kit of the F-18 costs £1.72. The samples of the two Phantoms and the Hornet models were kindly supplied by Bell Toys Ltd.

## Something different

If it is true that the kit manufacturers decide their future programmes as a result of

market research, then it can be presumed that the modelling world is calling out for F-16s, F-18s, etc. It would seem that the great emphasis on WW2 aircraft is a thing of the past. But, in the thought that there may still be some modellers around who are interested in aircraft other than the latest high-powered jets, a review of two Japanese single-seat fighters may be of interest — although the kits have been around for some time.

The Kawasaki Army Type 3, or Ki-61, was unusual in Japanese aircraft design in being powered by an in-line engine, the Ha-40 (Japanese production version of the Daimler Benz DB601A). Code-named 'Tony' by the Allies, the graceful Ki-61 was armed with two 20mm and two 12.5mm machine guns.

Hasegawa's 1:72 scale model of this Kawasaki fighter is nicely contoured and moulded. The fit of parts is excellent and there is delicate surface engraving. The cockpit is, of course, small and detail is limited.

The decal sheet gives markings for three Ki-16s. One is from the Akeno Air Training Division. The second is from the 244th Fighter Squadron, and the third is from the same squadron but flown by Commander Kobayashi. The last two are silver-painted with an over-dapple of dark green.

A much more typical Japanese fighter was the Nakajima Ki-44 Shoki radial-engined single-seat fighter. Known by the Japanese Army as the Type 2 fighter and 'Tojo' by the Allied forces, the Ki-44 was intended as a fast-climbing interceptor. For this reason the aircraft featured a big engine, the HA-109 14-cylinder, two-row radial, beautifully faired into the fuselage, and married to an unusually short span, small area wing. The proportions of the resulting design were unorthodox but, in my opinion, very attractive. The Ki-44 was intended to intercept medium altitude bombing raids, but the use of the B-29 Superfortress over Japan at heights beyond the capabilities of this fighter, limited its effectiveness. It was armed with four 12.5mm guns.

Hasegawa's 1:72 scale model is a nice replica, being well-moulded with an excellent fit of parts. Surface engraving is up to the high standards of Hasegawa. The cockpit area is very small and has no detail, but if the pilot figure is put into the seat, little can be seen anyway.

The model can be completed either as a Ki-44-I or Ki-44-II, and alternative canopies and changes to the engine cowlings are given. There is good detail on the engine and undercarriage legs. Drop tanks are included, and these are carried under the inner wing.

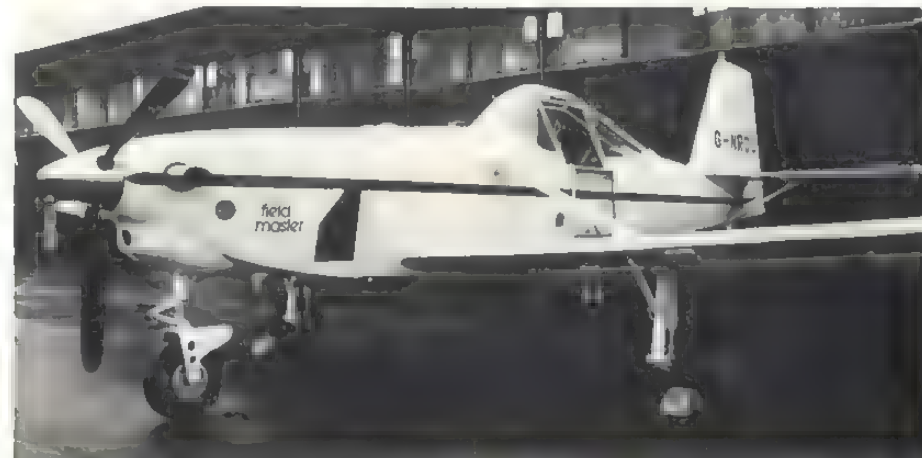
Markings are given for four Ki-44s. The first is from the Akeno Air Training Division, and is a Ki-44-I in silver and dapple green finish. The second is a Ki-44-II flown by Yoshio Yoshida of the 70th Fighter Squadron. The third example is a Ki-44-II from the 23rd Fighter Squadron, while the fourth is also a Ki-44-II, and is from the 246th Fighter Squadron.

Our samples of the 'Tony' and 'Tojo' kits were kindly supplied by A. A. Hales Ltd. They retail at 99p each.

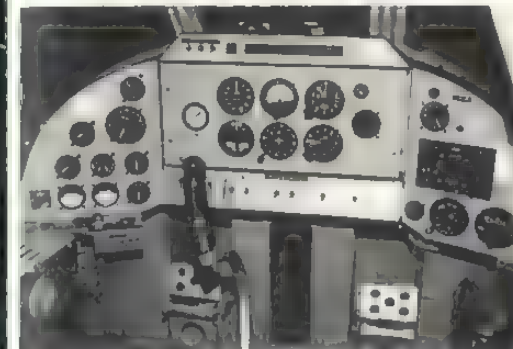




# NDN field master unveiled



impressive flying demonstration in the hands of test pilot Peter Phillips on 18 February, the high manoeuvrability of the aircraft was certainly not in question. Incorporated in the flaps is the liquid spray dispersal system. This arrangement eliminates the drag of the conventional spray boom which can use up as much as 10% of total horsepower. On the Fieldmaster the spray is discharged directly into the down-wash of the flaps so ensuring the best possible crop penetration.



**Top:** The prototype NDN6 Fieldmaster, G-NRDC, agricultural aircraft at Farnborough on 18 February. The large cockpit can accommodate a second occupant and dual controls can be fitted for instruction.

**Above:** The instrument panel of Fieldmaster, G-NRDC.

**Left:** NDN6 Fieldmaster, G-NRDC, flying low over the outskirts of Bognor Regis. The design of the aircraft incorporates a 93.3 cubic feet chemical hopper (the access panel of which can be seen in front of the cockpit), that is built as an integral part of the fuselage structure.

**Below:** Press photographers confronted by the Fieldmaster during the flying demonstration at Farnborough and...

**Below right:** ... chief test pilot Peter Phillips, brings the aircraft in to land at the conclusion of the display.

*All photos: Allen Burney*

A NEW British aeroplane, the NDN6 Fieldmaster, was unveiled at Farnborough on 18 February 1982. It is the first agricultural aircraft to be designed in Britain since the mid-1950s specifically for application of herbicides, pesticides, fertilisers, insecticides, and seeds, as well as fire-bombing and oil pollution control. It is also the largest agricultural aircraft to be built in the Western World and the first designed for turbo-prop power.

The design is being developed by NDN Aircraft Ltd with financial support from the National Research Development Corporation, a part of the British Technology Group — hence the prototype's registration G-NRDC. It features built-in ferry tanks for 700 miles, a buddy seat, and a large 93.3 cubic feet chemical hopper, made from lightweight, non-corrosive Titanium, built as an integral part of the fuselage structure. According to the manufacturer, this enables the Fieldmaster to carry a heavier load, have a faster working rate and burn less fuel in the process than any aircraft in its class. Powered by a Pratt & Whitney PT6A-34AG engine, the Fieldmaster is the design of Desmond Norman and his Isle of Wight-based team and it took to the air for the first time on 17 December 1981.

The Fieldmaster appears large for an agricultural aircraft, an impression that is no doubt exaggerated by the adoption of a non-retractable tricycle-type undercarriage; unlike the more usual tailwheel layout fitted to comparable designs. However, after an

NDN Aircraft hopes to complete enough flight testing in the next three months to allow production arrangements to be finalised. Plans covering quantity production in the UK and under licence abroad are progressing well and a number of orders, backed by deposits, have already been placed by distributors in the USA, New Zealand, Australia and Africa — the selling price of the fully-equipped aircraft is around \$400,000.

The prototype Fieldmaster, G-NRDC, made its first flight on 17 December 1981 at Sandown and is now well into its planned flight test programme. With over 30 flights completed many test areas have been explored and comparative tests of slot lip ailerons and external aerofoil ailerons have been made. Although the former offer some augmentation of rolling power with flap lowering it has been found that better handling is provided by the use of external aerofoil ailerons and these have now been adopted as standard.

Notwithstanding the large chord flaps and powerful PT6A engine, trim changes with variations in flap setting and power are found to be very small. An early look at longitudinal and lateral stability indicates that there should be few problems in these areas. Ground handling with nosewheel steering and the wide track landing gear is good and the reverse thrust capability allied with powerful disc brakes makes for a very short landing roll.

Stalls in both straight and turning flight,





power on and off, with and without flaps, have proved docile even at the most aft centre of gravity locations tested to date. Position errors have been determined by trailing a static cone 100ft below the aircraft.

Performance measurements have been carried out including level speeds, climbs at different flap settings and descents with feathered propeller. From these the drag polar is being determined for performance prediction in other conditions.

In the near future the flying weight will be increased progressively from the present figure of 6,000lb by additions of ballast in the hopper. Intermediate weights will be explored before going to the full gross weight of 10,000lb. Thereafter tests will take place with various forms of chemical dispersal equipment fitted.

The flight test programme to date has been carried out under the direction of NDN's chief aerodynamicist and flight test engineer, Terence Boughton, with chief test and demonstration pilot, Peter Phillips, or company chairman, Desmond Norman, at the controls.

#### NDN6 Fieldmaster

##### Provisional Specification

Engine Type: Pratt & Whitney PT6A-34AG  
 Engine Power: 750 shp  
 Propeller diameter: 106" Hartzell  
 Certificated Gross Weight: 10,000lb (4,536kg)  
 Typical Equipped Empty Weight\*: 4,500lb (2,041kg)  
 Useful Load: 5,500lb (2,495kg)  
 Hopper Capacity: 698 US Gal (2,642 Litres)  
 Design Manoeuvring Speed: 135kts (250km/hr)  
 Never Exceed Speed: 176kts (326km/hr)  
 Length: 36ft 2in (10.97m)  
 Wing Span: 50ft 3in (15.32m)  
 Wing Area: 338ft<sup>2</sup> (31.42m<sup>2</sup>)  
 Height: 12ft 3in (3.73m)  
 Undercarriage Track: 16ft 8in (5.08m)  
 Undercarriage Tread: 11ft (3.35m)  
 \*Would include spray system, two seats, dual controls, IFR instruments, nav/com package, antennas, working and nav lights, strobes, axe, first aid kit etc.

##### Provisional Performance in ISA (estimated)

(Sea Level 10,000lb all-up weight unless otherwise stated)  
 Maximum Speed (Clean) at 5,500ft: 148kts (284km/hr)  
 Speed at Maximum Cruise Power at 7,500ft: 140kts (259km/hr)  
 Stall Speed (Flaps Down) 10,000lb auw: 60kts (111km/hr)  
 Stall Speed (Flaps Down) 5,000lb auw: 43kts (80km/hr)  
 SL Rate of Climb (Clean) at 10,000lb auw: 740ft/min (3.76m/sec)  
 SL Rate of Climb (Clean) at 8,000lb: 1,150ft/min (5.84m/sec)  
 SL Rate of Climb (Clean) at 6,000lb: 1,750ft/min (8.89m/sec)  
 Take off Ground Run (Estimated): 850ft (259m)  
 Landing distance (with reverse thrust at usual operating weight — estimated): 300ft (91m)  
 Range, wing tanks full at 10,000ft, with two crew and 1,000lb equipment in hopper — no reserves: 700nm (1,297km)

# Northwest Orient Airlines

All photos courtesy Northwest Orient Airlines unless otherwise credited



**John Huizing provides a historical background to one of the longest established airlines in the US**

NORTHWEST Orient Airlines is the second oldest airline in the US and while it may not enjoy such worldwide recognition as some of its compatriots — Pan Am, TWA, American or United for example — it remains nevertheless one of the most lucrative carriers in America.

It has maintained a continuous identification from its foundation on 1 August 1926 but Northwest's subsequent growth has increased the area of operations far beyond

that indicated by its name. Services started on 1 October 1926 with the transportation of airmail between Minneapolis/St Paul and Chicago using two rented Curtiss OX-5s; financial backing was supplied by businessmen in Minneapolis/St Paul and Detroit.

The first passenger-carrying flight was inaugurated on 5 July 1927 with a service from Wold-Chamberlain Field (an old raceway-turned-airport on the southern borders of Minneapolis/St Paul) to Chicago, Ill. Piloted by one of Northwest's pioneers of airmail services, Charlie 'Speed' Holman, the aircraft utilised was a Stinson Detrolter — so-called because it was designed by Eddie Stinson and manufactured in the 'Motor City'. The flight proved to be an eventful one and shortly after take-off the aircraft had to make an emergency landing near the Mississippi River due to engine trouble. The Detrolter was transported back to Wold-Chamberlain Field by truck and a second attempt was made. Holman managed to fly

Below: In 1926 Northwest started operations with two rented Curtiss OX-5s one of which was X-7087. The aircraft was flown by Charlie 'Speed' Holman, one of the airline's pioneering pilots.

Bottom: Northwest's first passenger services were flown in 1927 using the Stinson SM-1F Detrolter. The type had a maximum speed of 85mph (136km/h) and was the first closed-cabin type to enter service in the US.



**Above: The mainstay of Northwest Orient Airlines' present fleet is the Boeing 727 trijet. This example, N261US, is one of 23 -200 variants operated by the airline — Northwest also utilises -C, -100 and -200A versions of the Boeing 727.**

Right: As the airline gradually expanded in the early-1930s, new types were introduced into the Northwest fleet including this Travel Air Model A-600A.

Below right: Photographed over the twin cities of Minneapolis/St Paul was Martin 2-0-2, N93051. Northwest began operations from Wold-Chamberlain Field (an old raceway-turned-airport on the southern borders of the cities).

Bottom right: Douglas DC-4, N95413, in the livery of Northwest. During the Korean War the airline's DC-4s saw extensive service between the USA and Korea when they were chartered by the US services.



the aircraft safely to Chicago, which was reached late in the night, via La Crosse, Madison and Milwaukee; still with the same passenger aboard as on the first attempt!

Northwest continued its services in 1927 for a further three months, before operations were temporarily suspended for the winter period. During its initial three months Northwest carried 106 passengers with its fleet of three Detrolters, which were, incidentally, the first closed-cabin aircraft in the USA. The airline's main interest, however, was still in airmail.

From 1928 through 1933 Northwest continuously expanded westward, city by city, through North and South Dakota, Montana, Idaho and Washington State. These services were added to during the 1940s as the airline extended its operations to the East Coast and overseas to destinations in the Pacific.

Because of the experience Northwest had gained on flying the Northern trans-continental routes, the US Government called on the airline at the onset of WW2 to set up and operate a military cargo route to Canada, Alaska and the Aleutians. When hostilities eventually ceased in 1945, this was taken into account by the Civil Aeronautics Board with the allocation of new routes and Northwest was certified to fly to the Far East via the short 'Great Circle' route on 1 August 1946. After starting to operate into Anchorage, initially from Seattle/Tacoma and later from Minneapolis/St Paul via Edmonton, Northwest started scheduled MAY 1982





services to the Orient on 15 July 1947 — destinations included Tokyo, Seoul, Shanghai, Manila and later Formosa (Taiwan). During the 1947-49 period these services represented nearly 30% of Northwest's international passenger traffic, so when the airline had to cancel the services to mainland China in 1949 for political reasons, this represented a severe blow.

In the meantime, however, Northwest continued to expand domestically, with the

**Left: Sporting Northwest Orient Airlines' titles on the nose was this L-1049C Super Constellation, seen prior to delivery to the airline around 1955.**

**Below: The seventh of 10 Boeing 377 Stratocruisers that were used by Northwest. This particular aircraft, N74607, c/n 15953 entered service on 21 September 1949 and was christened 'Stratocruiser Honolulu'. After a Bendix X-band radar was installed in April 1955 it was renamed 'Stratocruiser Rudolph with the radar nose'!**

**Bottom: Boeing 720B, N721US, over the snow-capped mountains of northwest America. For many years Boeing 707/720s provided the backbone of the airline's fleet.**

inauguration of services from Detroit to Washington DC via Cleveland and Pittsburgh and from Seattle/Tacoma and Portland, Or in the early-1950s. Routes were established linking Northwest's existing network in the northwest of the USA with the southeast, including cities like Miami, Fort Lauderdale and Atlanta.

In the mid-1960s Northwest once again focused its attention on the Orient, with the inauguration of services to Hong Kong and Osaka in Japan. To date the airline has not been able to re-establish services to mainland China, although it has been pursuing this aim for some time now; flying visiting Chinese officials in America and US businessmen to the first US industrial exhibition in the People's Republic of China in November 1980.

The Airline Deregulation Act of 1978 provided Northwest with the opportunity to include additional destinations in its network, but also granted other airlines access to routes that were previously operated exclusively by Northwest.



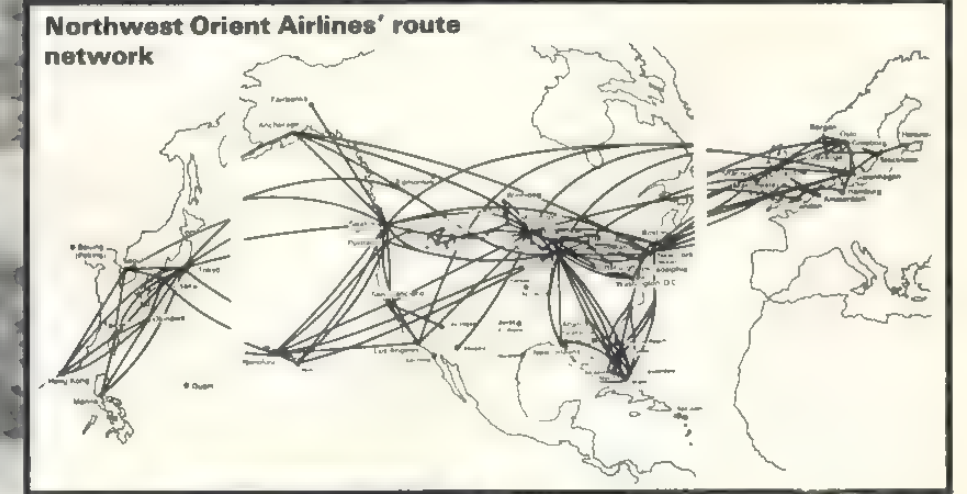
**Top: In relation to its size, Northwest has the most wide-bodied aircraft in its inventory of all US airlines. Included among 29 Boeing 747s are five -200F Freighters largely used on trans-Atlantic services to Europe. Photo: Boeing**

**Above: The other wide-body type operated by the airline is the DC-10 of which 22 are in service. Photo: McDonnell Douglas**

Of late Northwest has been concentrating on the introduction of trans-Atlantic services to Europe, starting with a New York-Boston-Glasgow-Copenhagen all-cargo service with Boeing 747 Freighters and a New York-Copenhagen-Stockholm passenger service in 1979, followed by several additional services in 1980 and 1981.

From its humble beginning with a handful of aircraft, Northwest Orient Airlines has kept astride with the rapid evolution of the airline industry and has grown to become a leading US carrier with an impressive fleet of modern jets — Boeing 727s, Boeing 747s and DC-10s.

The steady and successful history of Northwest can be attributed to the solid foundations on which its operations were founded as well as its ambitious yet realistic outlook with regard to expansion.







# 'KZ Rally' at Stauning

One of the venues on the European airshow circuit is Stauning in Denmark where the annual 'KZ Rally' is held. Keith Wilson visited Stauning for the 1981 event and describes the range of attractions that awaits visitors to this year's rally, which is due to be held on 3-6 June

FROM ITS humble beginning in September 1968, when the first of what has now become known as the 'KZ Rally' was held, the 1981 event continued to demonstrate the expansion of the KZ and Veteranfly Klubben in Europe. Held at Stauning airport near Ringkøbing in Western Jutland, Denmark, only bad weather kept the number of visiting aircraft down to 300; although when added to the residents, this meant that almost 350 aircraft were present during the *Concours d'Elegance* and flying display. One wonders if Magnus Pedersen, who formed the original *KZ og Veteranflyklubben* in 1969, following the success of the first KZ fly-in, could have imagined the growth that was to come. At present the club owns well over 100 vintage aircraft and while the annual rally at Stauning is the main external event, the club also arranges overseas tours such as the one to the UK in 1980 to attend both the PFA rally at Leicester and the Air Britain fly-in at Old Warden.

At Stauning, the distinction between veteran aircraft and 'spam-cans' is obvious, each class having its own parking area; the veterans close to the viewing area and airport facilities, while the 'others' have a large section at the far end of the airfield largely out of sight! Of the 300 or so aircraft that attended in 1981, the mix was about 50/50, so the parking areas were of a similar size, if completely dissimilar in characteristics. There was also a special area right in the front of the public enclosure where the 'stars' were parked and in it were no less



than five DH82A Tiger Moths (HB-UBC, LN-KAY, LN-BDM, OY-DGH, and OY-ECH), Super Aero 45 OY-EFC immaculately restored by Herbert Mitrofanov, Bellanca 260 Model 14-13-3 HB-DUN, Bucker Bu181D Bestmann OY-AVZ, two SAAB 91D Safirs (LN-MAZ and SE-IGP) and numerous KZ variants. Many of these aircraft were to feature in the flying display and were joined by a contingent of the RDAF. The latter included a rescue demonstration by an S-61, spritely flying by a Hughes 500M, speed and noise from an F-16 Fighting Falcon and a formation flypast of four F-100 Super Sabres from the nearby 730 ESK at Skrydstrup who were in and out of what seemed to be an ever-lowering cloud base. To complete the military scene, the venerable C-47 Dakota from 721 ESK performed before landing for fuel. It departed about an hour later in appalling weather. Many of the various KZ types took to the air and a number of interesting group flypasts were also put together. Five DH82A Tiger Moths formed and the UK trio of Proctors (G-ALJF, 'OGE and 'NXX) made a series of flypasts before breaking off for a stream landing, a sight for sore eyes! Many Piper variants then took to the air including Cubs, Vagabonds and a Clipper and the programme was closed by some very 'crazy flying' by Cessna 170B, OO-SIZ.

A close inspection of the vintage aircraft

Top: The superbly presented KZ VII Laerke, OH-KZC, won two awards at the 1981 'KZ Rally'; the *Concours d'Elegance* for the KZ VII group and the trophy for the longest flight to participate in the event — 1,208km. All photos: Keith Wilson/Starliner Aviation Press

Above: Super Aero 45, OY-EFC, also won an award at the '14th International KZ Rally' for the 'best restoration in the last 12 months'. The aircraft was painstakingly re-built by Herbert Mitrofanov.

park revealed a considerable number of types rarely seen in the UK although many others are comparatively common over the English skies. What does catch the eye is the immaculate standard that aircraft are maintained in Denmark and the surrounding countries, and the amazing lengths of restoration that some owners will go to. The Super Aero 45 OY-EFC is a good example of this. Painstakingly re-built by Herbert Mitrofanov, it won him the award of 'best restoration in the last 12 months' — one shudders to think of the hours that were spent in presenting the aircraft to such a high standard. Because of the large number of KZ III and KZ VII aircraft that are now flying in Denmark, two special groups were created in the *Concours d'Elegance* for these types. Quite a number of the KZ VIIIs were on

AIRCRAFT ILLUSTRATED

hand to compete for this trophy, finally awarded to Juha Riteranta and Pauli Huiken for their beautifully turned out OH-KZC. In the KZ III group, the organisers were very disappointed in the turn-out, only two aircraft competed and the award finally went to OY-DEJ lovingly maintained by the KZ III group at Viborg.

Homebuilt aircraft featured more predominately at the 1981 event and, following the formation of Chapter 655 of the Experimental Aircraft Association, it is anticipated that this group will show the largest increase in coming years. At present the Danish Authorities will only allow aircraft with a type certificate to be registered in Denmark, leaving homebuilders with types such as the Jodel D112M, Jurca Template and Turbulent, but this all should change in the near future, allowing an increase in variety to the Danish register. The top prize went to Jodel D112M OY-AMD completed in 1980 by Kai Christensen but was very closely

followed by Evald Christensen's Jurca MJ2D Template OY-AMV.

Three vintage aircraft groups are also catered for in the *Concours d'Elegance*, being (1) aircraft built after 1945, (2) aircraft built during 1940-45 and (3) aircraft built pre-1939. In the 'after 1945' group, Henry Scholl from nearby Esbjerg won first prize with his Piper PA-18 Super Cub OY-EFA, very closely followed by Jorgen Christensen's Bucker Bu181D Bestmann OY-AVZ, finished in its former RSwedAF colour scheme. The British registered Percival PA34A Proctor 3 G-ALJF flown to the rally by John Bryan from Biggin Hill, won the top prize in the 1940-45 group, although only two points behind was the Norwegian registered DH82A Tiger Moth LN-BDM. Top prize in the pre-1939 class went to a Stinson HW-75 OY-EFP although only 4.6 points separated first and fourth place in this group. KZII Koupe OY-DHK, DH82A Tiger Moth HB-UBC and Aeronca C-50 D-EFEL filled these positions.

Mention should be made of one aircraft that stood out in the veteran parking area, although maybe for the wrong reasons. Parked among the various Pipers and Chipmunks, was a lone Beech 35 Bonanza HB-EBD. Superbly finished externally and



Left: An F-16 Fighting Falcon of the RDAF participated in the flying display at Stauning...

Below: ... as did C-47 Dakota, K-888, from 721 ESK. After its demonstration the aircraft landed at Stauning to take on fuel.

Bottom: Top prize in the pre-1939 class went to Stinson HW-75, OY-EFP.



equipped for just about all weathers internally, it seemed at first sight, that the organisers had made a serious error but some enquiries revealed that the aircraft was constructed in 1947. Although one year short of its 25 year old veteran status, the organisers obviously recognised the amount of work that had been put into the aircraft. If it returns in 1982, its owner Hubert Sonderegger can park it in the veteran area without a guilty conscience; although the idea of a Bonanza being a veteran type will take some getting used to!

Stauning Airport is almost the perfect location to hold a rally and the organisation of the KZ club is second to none. Facilities include a beautiful terminal (it serves daily domestic flights including Maersk Air BAe748s and Aeroservice Fairchild F27s) with excellent 'met' and flight-planning areas, plenty of fuel very reasonably priced, adequate hangarage and maintenance facilities and a pleasant restaurant. The KZ club arranges for visiting pilots a choice of accommodation including camping, army style bunk rooms and hotels and plenty of refreshments. It also provides ground displays and entertainment in the evenings. If you can drag yourself away from all the participating aircraft, the KZ museum is housed on the airport, containing some 21 vintage aircraft and gliders and entry is free. Here, future rally participants can be inspected undergoing restoration and with the recent completion of purpose-built workshops, projects should be completed considerably faster than their present rate.

The spirit of the KZ Rally is unquestionable and in 1981 it was optimised by the award of the longest flight trophy once again to the crew of the KZVII Laerke OH-KZC who flew 1,208km to attend. Pilots can be seen lovingly polishing their aircraft before the events to ensure they look at their very best and with the considerable variety of languages it was amazing to see information and advice being freely exchanged, even when translation was a problem.

Formalities are at a minimum at Stauning, allowing every visitor to enjoy their stay with a minimum of red tape. Danish hospitality has to be received to be believed and the author can thoroughly recommend a visit to the KZ Rally in 1982.



The aircraft of the Battle of Britain Memorial Flight (BBMF) are undoubtedly one of the most popular attractions on the UK airshow circuit. Few types evoke such a sentimental reaction from the crowd, young and old alike, as do the Flight's Spitfires, Hurricanes and Lancaster.

However, to keep a fleet of WW2-vintage aircraft airworthy requires a vast amount of expertise and hard work and to see how the BBMF was preparing for the 1982 airshow season, Francois Prins visited the Flight's headquarters at RAF Coningsby, Lincs in February.

# The BBMF

## ● BBMF Spitfires

Top right: Four Spitfires are operated by the BBMF, two of which are seen in this view across the Flight's hangar at Coningsby. In the foreground is Spitfire VB, AB910, now fully airworthy after its major rebuild following its accident three years ago. The aircraft is coded XT-M of No 603 Squadron and will appear at 1982 airshows. The other Spitfire in the photograph is...

Above right: ... XIX, PM631. This aircraft, together with Spitfire IIA, P7350, has been fully serviced and is ready for the airshow season. BBMF's fourth Spitfire, XIX PS853, is largely dismantled. Its Griffon engine is at present being fully rebuilt free of charge by Rolls-Royce but the aircraft will not be flown this year. Work on PS853 is scheduled to be completed in early-1983 and the Spitfire will retain its PR Blue colour scheme.

## ● Lancaster PA474

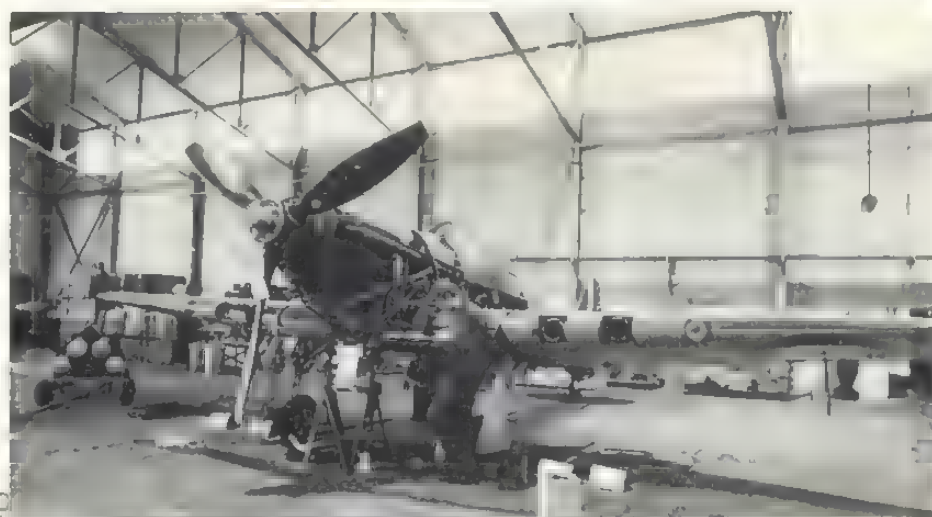
Centre right: Lancaster PA474 has undergone a major overhaul for the 1982 season. As shown in this view taken in February, the Rolls-Royce Merlin engines (foreground) and tail assembly were removed. When the tail assembly and rear turret were dismantled, the BBMF expected to find a great deal of corrosion as the tail had not been removed since 1947. It was delighted to find only a few tiny spots of rust inside part of the fin and this was soon cured. PA474 was scheduled to make its first flight for 1982 in late-March or early-April with the BBMF CO Sqn Ldr S. Anderson at the controls. The aircraft code is still that of Guy Gibson's AJ-G from No 617 Squadron 'the Dambusters'.

## ● Hurricanes LF363 and PZ865

Right: A great deal of work was being carried out on the engine and fuselage of Hurricane IIC, LF363, during the photographer's visit to Coningsby. However, this 1944-vintage aircraft is scheduled to be appearing at 1982 airshows, as is the BBMF's other Hurricane, IIC PZ865. The latter example has also undergone a full overhaul and repainting. It carries the title 'The Last of the Many' under the cockpit.



## pre-season preparations



# RAF ST ATHAN

(NEAR CARDIFF)

# 'AT HOME'

# DAY

# SATURDAY

# 18th SEPTEMBER 1982

10am - 6pm

## COME AND SEE DISPLAYS BY:

- THE RED ARROWS
- THE FALCONS
- TORNADO
- HARRIER
- BATTLE OF BRITAIN MEMORIAL FLIGHT
- VINTAGE PAIR
- ... AND MANY MORE
- PLUS MANY STATIC AIRCRAFT DISPLAYS

For further information contact:

RAF St Athan, Barry, South Glamorgan CF6 9WA. Tel: 04425 3131, Ext 3356

Details of the Flying Display are correct as at 15th February 1982. The organisers retain the right to change the content of the display.



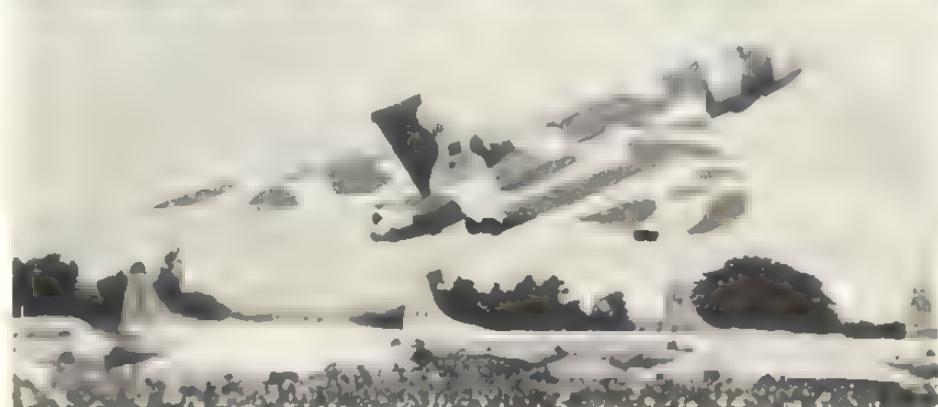
# airshow82

**Peter R. March** previews the forthcoming season of air events

WITH OVER 200 air events already on the calendar for 1982, it looks like being a bumper year for the air minded public and enthusiast alike. There is a real mix of events, ranging from the big national spectacles like Farnborough and Army Air 82 at Middle Wallop down to a host of fly-ins, rallies and even a picnic. These will be hosted at sites from Cornwall to the Scottish Highlands, with an event listed for the first time in the Orkneys. The three services have their traditional programmes with the Navy presenting its Air Days at the usual venues and flying participation at the Dockyard Navy Days. A new location this year, however, is the range at Llangennech, Dyfed which is holding an Open Day and display on 24 July. The RAF has a scattering of Open Days throughout the year starting with Innsworth and Cosford on 9 May and continuing to the Battle of Britain events at Abingdon and St Athan on 18 September. A significant newcomer to the RAF list for 1982 is Brize Norton which plays host to the Defence College on 11 June and is open to the public with a full display on the following day. The Army is concentrating its efforts into the silver jubilee three-day event at Middle Wallop on 23-25 July.

Defence cuts and the recession in general is beginning to have an effect on participation at displays. The RAF has reduced quite markedly the number of 'operational aircraft' providing flying displays this year. In general only one fighter type is allocated by Strike Command for a month at a time. This year sees the end of the Vulcan as a display aeroplane but the Tornado will not be greatly in evidence as a replacement on the air show round. Even the regulars like the Vintage Pair and Battle of Britain Memorial Flight have been allocated more sparingly. Unfortunately work on the Lancaster PA474 will take until mid summer and it is unlikely to appear at air shows before August (this updates the information given on page 228 — Ed).

The 'Red Arrows' goes into its season with a new leader, Sqn Ldr John Blackwell and newcomers at numbers eight and nine, Tim Miller and Phil Tolman. The display will also have some new features including a Card Nine loop, one of the most difficult manoeuvres to be attempted by the team, a slow flypast with under-carriages down and smoke on (if the wind is blowing away from the crowd!), the Cascade and Undercarriage Rollback will be re-introduced and the programme will end with what is now called the Spaghetti Break followed by the Rocket



Climb if weather conditions permit. The 'Arrows' go into the season with an impressive record behind them: 1,505 public displays of which 1,260 were flying Gnats. In 1981 the team gave 126 performances and have a similar number scheduled for this year, beginning with shows at Sywell and Thruxton on Easter Monday and running through to the end of September. Overseas fixtures for the 'Red Arrows' take them to France, Holland and the Hannover Air Show in Germany in May, a trip to Karup, Denmark on 20 June and return trips to Germany on 1 August and again in September. 'Red Arrows' veteran Flt Lt Wyndham Ward will be flying his fourth season with the team, having chalked up 356 public performances to date and by the end of the year will be approaching 500, a record which will be very hard to match.

Helicopters will be much in evidence over Hampshire during the period 19-25 July, when several events will be brought together to mark the Army Air Corps' 25th anniversary. Helimeet International, a com-

petition and symposium for military and commercial helicopter operators and crews will include an event at Broadlands House, Romsey on 20 July. To date 30 helicopters have been entered from France, Italy, Belgium, Spain, Sweden, Australia and Zimbabwe including our own services. The organisers expect the total to rise to 50 with several types and air arms new to this country. The International Military

**Top:** Goodbye Vulcan — the final airshow appearances by the majestic delta will be made before June when the type finally bows out of service. Some of the 'SAR Meet' participants at last year's International Air Tattoo provide a backdrop to XM602 as it climbs out to begin its display.

**Above:** The 'Red Arrows' team for the 1982 season. From left to right (front) are: Henry de Courcier (7), Tim Miller (8), Byron Walters (2), John Blackwell (1), Tim Watts (6), Iain Huzzard (4), WO George Thorne (Adj), John Myers (3) and (rear) Ray Thilthorpe (10—manager), Gordon Nisbet (Eng), Wyndham Ward (5) and Phil Tolman (9). *Photos: Peter R. March*

AIRCRAFT ILLUSTRATED

Helicopter and Equipment Exhibition will take place at Middle Wallop from 22-25 July, while at the same location the public air show Army Air 82 will present a five-hour flying display on 23-25 July. There will be royal patronage on the first of these days and on the Saturday and Sunday mornings the British Helicopter Championships will be staged. It is expected that there will be well over 200 helicopters and some 100 or more fixed wing aircraft at Middle Wallop, the country's largest grass airfield through the weekend. The Army Air Corps is forming a new helicopter display team especially for Army Air 82; appropriately named the 'Silver Eagles' it will fly six Lynx AH1s. As with the birth of the famous 'Blue Eagles' back in 1968 this new team comprises instructors from the Army Air Corps Centre and will work up its display routine as a continuation flying exercise.

An interesting new approach to air shows is being made by Alan Goldsmith at Elstree in May and at the Essex Show Ground in August. To quote Mr Goldsmith 'it is my opinion that air shows have become rather mundane over the last few years and the public are losing interest. This year to maintain the good attendance that we are used to, we are going to stage something unique in this country, a battle-attack air show. This will be an allied fighter and bomber attack on a mock German airfield. We will build mock bunkers and buildings etc and involve some 200 or so actors. A considerable sum of money will be spent on pyrotechnics, explosives and some very realistic looking flak. It is hoped that by staging this full scale set piece we will bring back some of the excitement and drama to the shows and will attract the family as well

**Below:** The BAe146 will undoubtedly be one of the major attractions at the SBAC Exhibition and Flying Display to be held at Farnborough on 5-12 September 1982. The public days for the event will be held on 10-12 September while the press preview and trade dates are 5-9 September. *Photo: BAe Hatfield*



MAY 1982



**Above:** The main highlight of the year for the home-builder is the PFA International Rally, which in 1982 moves to Cranfield on 2-4 July; last year's event (seen here) was held at Leicester. *Photo: Peter R. March*

as the air enthusiasts'. You have been warned!

On the vintage and veteran scene there will be plenty to see with events through the season at Old Warden, Strathallan and Duxford. The Vintage Aircraft Club continues its activities centred on Fimere usually on the first Sunday in the month. The PFA has moved its International Air Rally from Leicester to the much more suitable venue at Cranfield on the first weekend in July. The PFA Strut programme starts on 18 April with the traditional Henstridge Fly-in and is followed by Barton and Middle Wallop on the succeeding weekends. The Recreational Flying Club at Popham, Hants will have its usual fly-ins on the second Sunday of most months and has now been joined by similar fixtures at Sandown, IOW.

The SBAC International Air Show in September looks like having a great deal of interest to the technically minded, enthusiast

and spectator alike. There will be more new aircraft on show than for several years with our own BAe146 in the forefront alongside the Boeing 757 and 767. The organisers have already sold all the ground exhibition space and there seems to be more new products and technical developments to show than ever before.

The 1982 air events programme has a great deal to offer, particularly if you live in southern England or the Midlands. Positive attempts are being made by some organisers, in particular Jock Maitland's Air Displays International to bring more air shows to the North. He has arranged events at Sunderland and Liverpool in June. The RAF has new Open Days at Cranwell and Swindon as well as the regular Binbrook display this year. The success or otherwise wherever the event is held will depend largely on the weather on one hand and the support it gets from the public on the other. Costs of running air shows and flying aeroplanes at them have risen enormously. The rate for such evergreen items as the B-17 'Sally B' can be as much as £2,000 for a single display, depending on how far the event is from the aircraft's home base. The owners of historic aircraft have been hit by steep increases in bills for insurance and avgas during the past 12 months as well as the usual difficulties in obtaining spares and maintaining their aircraft in peak condition. Industrial recession has reduced the amount of sponsorship available and cost conscious manufacturers seem less willing now to donate time and materials to assist owners with their aircraft.

So if there's an air show near you this year please give it your support and encourage as many other people to attend as you can. Most events are extremely good value for money when you compare the admission charge for a day's entertainment with what you might pay for a football match or cinema/theatre entry.

Finally a reminder that this information and calendar of 'airevents 82' is *provisional*, having been compiled before the start of the air show season. You are advised to check with organisers before setting out for an event that it is taking place on the date and at the venue anticipated.



# UK & Eire airevents 82

Compiled by Peter R. March

## April

- 11-12 Sywell, Northants: Barnstormers Air Display  
 12 Old Warden, Beds: Shuttleworth Bank Holiday Display  
 12 Popham, Hants: Jodel Fly-in  
 18 Henstridge, Somerset: PFA Wessex Strut Spring Fly-in  
 18 Old Warden, Beds: International Auster Pilot Club Fly-in  
 25 Barton, Manchester: PFA North-West Strut Fly-in  
 30-2 May — Jersey, CI: Jersey International Air Rally

## May

- 1-3 Sandown, IoW: Microlight Weekend  
 2 Duxford, Cambs: Local Flying Day  
 2 Finmere, Bucks: Gemini Lunch Patrol  
 2 Sandown, IoW: Breakfast Patrol  
 2-3 Stapleford Tawney, Essex: Warplane Air Show  
 3 Chepstow, Gwent: Red Arrows at Spring Spectacular  
 3 Shanklin, IoW: Red Arrows at Shanklin Festival  
 9 RAF Cosford, West Midlands: Cosford Aerospace Museum Open Day and RAF Air Display  
 9 Staverton, Glos: RAF Innsworth Open Day and Air Display  
 9 Popham, Hants: British Aircraft Fly-in  
 9 Middle Wallop, Hants: PFA Hampshire Strut Rally  
 15 RAF Coltishall, Norfolk: Families Day  
 15-16 Biggin Hill, Kent: International Air Fair  
 16 Old Warden, Beds: AOPA Fly-in and Conference  
 16 Old Warden, Beds: Shuttleworth Informal Flying Occasion  
 16 Barton, Manchester: Manchester Air Show  
 21-23 Eglington, Londonderry: Amelia Earhart Commemorative Air Rally and London-Eglington Air Race  
 27 Llanidloes, Powys: Air Display incl Red Arrows  
 29 RAF Wyton, Cambs: Canberra Reunion  
 29-30 RAF Mildenhall, Suffolk: Air Fete 82  
 29-30 Sturgate, Lincs: PFA Northern Gyroplane Strut Rally  
 29-31 Boston, Lincs: Vintage Aircraft Club Spring Bank Holiday Camp  
 30 Old Warden, Beds: Shuttleworth Spring Holiday Display  
 30-31 HM Dockyard Chatham, Kent: Navy Days  
 30-31 Leicester East, Leics: Competition Weekend and IAPC Fly-in



Above: This forlorn-looking F-15 serves as a reminder that accidents do occasionally happen at air shows and it is therefore in the spectators' own interests to adhere to the restrictions imposed by the organisers. The unlucky Eagle in the landing 'mishap' at the Soesterburg AB Open Day on 11 September was Bitburg-based USAF F-15C, 80-0007 of the 36th TFW; fortunately the pilot walked away from the crash unharmed.  
 Photo: Ben J. Ullings/Aviation Photos International

- 30-31 Elstree, Herts: Battle-Attack Air Show  
 31 RAF Henlow, Beds: Open Day Display  
**June**  
 4-6 Carnemore, Galway: Galway Flying Club Fly-in and Rally  
 5 — RAF Bentwaters, Suffolk: USAF Open Day  
 5 Prestwick, Ayr: HMS Gannet Air Day  
 5 Bury, Lancs: Red Arrows at the Services Tattoo  
 5 Blackpool, Lancs: Microlight Air Race to Eifel Tower, Paris  
 5 Old Warden, Beds: Shuttleworth Flying Evening  
 5-13 Lasham, Hants: National Gliding Championships (Open Class)  
 6 Seething, Norfolk: Waveney Flying Group Air Show  
 6 Squires Gate, Lancs: Blackpool Air Show  
 6 Finmere, Bucks: VAC Vintage Car Day & Fly-in  
 6 Sandown, IoW: IoW Strut PFA Breakfast Patrol  
 6 Doncaster, Yorks: Red Arrows at IMPEL 82  
 8 & 10 Ronaldsway, IoM: Red Arrows at IoM TT Races  
 11-13 Newcastle-upon-Tyne: Northumbria International Air Rally  
 12 — RAF Brize Norton, Oxon: Open Day & Air Display  
 12 Dunsfold, Surrey: British Aerospace Open Day  
 12 Hawarden, Clwyd: British Aerospace Families Day  
 12 Leavesden, Herts: Rolls-Royce Open Day  
 12 RAF Halton, Bucks: Open Day & Air Display  
 12 RNAY Fleetlands, Hants: Open Day  
 12 Gowran Grange, Co Kildare: Leinster Aero Club Fly-in & At Home  
 12-13 Strathallan, Auchterarder, Perth: Flying Days

- 13 Duxford, Cambs: Duxford 82 Air Display  
 13 RAF Church Fenton, Yorks: SSAFA Air Display  
 13 Sandown, IoW: Moths & Fabric Aircraft Fly-in  
 17 Bournemouth-Hurn, Dorset: Staging point for Kinair Rally  
 18 Lochinvar, Highlands: Red Arrows display  
 18-20 Kilkenny: Kinair 82 10th International Air Rally and Race  
 19 Cheltenham Race Course, Glos: Colt National Helicopter Fair  
 19 Aberdeen, Grampian: Red Arrows display  
 19 — RAF Honington, Suffolk: Open Day & Air Display  
 19 RAF Swanton Morley, Norfolk: Open Day & Air Display  
 20 Sunderland, Tyne & Wear: Sunderland Air Show  
 20 RAF Swindon, Yorks: Open Day & Air Display  
 21 RAF Wittering, Northants: Royal Visit for 40th Anniversary of RAF Regiment  
 26 RAF Locking, Avon: Flowerdown Fair & Air Display  
 26 Woodford, Cheshire: RAFA Air Display  
 26 Rotherham, Yorks: Red Arrows at the Rotherham Tattoo  
 26 Hamble, Hants: Folland Sports Gala Day  
 26-27 Calshot, Hants: Schneider Commemorative Event  
 26-27 Hendon, London: RAF Museum Pageant



Royal Air Force Innsworth

## AIR DISPLAY

Staverton Airport

(BETWEEN CHELTENHAM & GLOUCESTER)

**Sunday 9th May**

Featuring:

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- 27 Shepton Mallet, Somerset: Wings and Wheels Event
- 27 Liverpool-Speke, Merseyside: Liverpool Air Show
- 27 Old Warden, Beds: Shuttleworth Informal Flying Occasion
- 27 Henstridge, Somerset: PFA Wessex Strut Picnic Fly-in

### July

- 2-4 Cranfield, Beds: PFA International Air Rally
- 3 Redcar Racecourse, N Yorks: Red Arrows at Teesside Gala
- 3 Whitley Bay, Tyne & Wear: Red Arrows at Blyth Carnival
- 3 RAF Chicksands, Beds: USAFE Open Day
- 3 Hatfield, Herts: British Aerospace Open Day
- 4 RAF Lakenheath, Suffolk: USAFE Open Day
- 4 Humberside Airport: Eastern International Air Fair
- 4 Old Warden, Beds: Dunlop Day
- 4 Donington Park, Derby: Red Arrows at F2 Race Meeting
- 4 Sandown, IoW: Breakfast Patrol
- 9 The Common, Southampton, Hants: RAF displays at Southampton Show
- 10 Exeter, Devon: RAFA South-West Air Display
- 10 Plymouth, Devon: Air Display
- 10-18 Dunstable, Beds: UK 15m Gliding Championships
- 11 Strathallan, Perth: Strathallan Flying Display
- 11 RAF Cranwell, Lincs: Open Day and Display
- 11 Essex Showground, Chelmsford: Red Arrows at Essex St John Gala
- 11 Pontefract, W Yorks: RAF display at Pontefract Gala
- 11 Popham, Hants: Biplane Fly-in
- 11 Sandown, IoW: Taildraggers Fly-in
- 17 Old Warden, Beds: Shuttleworth Flying Evening
- 17 Lee-on-Solent, Hants: HMS Daedalus Air Day
- 17 Holker Hall, Cumbria: Red Arrows at Lakeland Rose show
- 17-18 Castlebridge, Co Wexford: Irish National Aerobatic Competition
- 17-18 Portland, Dorset: Portland Open Days
- 18 Bournemouth-Hurn, Dorset: Bournemouth Air Pageant
- 18 Badminton, Avon: Badminton Air Day
- 18 Weston Park, Salop: Air Display
- 18 Shobdon, Hereford & Worcs: Air Display
- 18 Stoke Mandeville, Bucks: Vintage Aircraft Club Fly-in
- 18 Brands Hatch, Kent: Red Arrows at British Grand Prix
- 18 Lyme Regis, Dorset: Red Arrows at Lifeboat Day
- 20 Broadlands House, Romsey, Hants: Helimeet International Competition
- 22 RAF Brawdy, Dyfed: Open Day & Air Display
- 22 Llandudno, Clwyd: Llandudno Air Display

- 23 Eastbourne, East Sussex: Eastbourne Air Show
- 23 Falmouth, Cornwall: Red Arrows Display
- 23-25 Middle Wallop, Hants: Army Air 82 & International Military Helicopter & Equipment Exhibition
- 24 RAF Wethersfield, Essex: USAFE Open Day
- 24 Llangennech, Dyfed: RN Open Day
- 24 Hastings, East Sussex: Red Arrows at Hastings Carnival
- 25 Bodmin, Cornwall: Cornwall Air Day
- 25 Old Warden, Beds: Shuttleworth Military Air Pageant
- 25 RAF Fairford, Glos: USAFE Open Day
- 27 RAF Odiham, Hants: Families Day
- 28 RNAS Culdrose, Cornwall: Culdrose Air Day
- 28 Ramsgate, Kent: Red Arrows at RAF Town Show
- 28-29 Cleethorpes, Lincs: RAF Displays at Cleethorpes Carnival
- 29 Weston-super-Mare, Avon: Great Weston Air Day
- 29 St Helens, Merseyside: RAF Displays at St Helens Show
- 31 RNAS Yeovilton, Somerset: International Air Day
- 31 RAF Wyton, Cambs: Families Day
- 31 Bournemouth, Dorset: Red Arrows at Bournemouth Regatta

### August

- 1 Duxford, Cambs: Military Show & Fire Brigade Display
- 1 Fairoaks, Surrey: Air Show
- 6-8 Abbeyshrule, Co Longford: International Fly-in Festival Weekend
- 6-8 Newtownards, Co Down: International Air Rally
- 7 Wycombe Park, Bucks: UK Standard Class Gliding Championships
- 7 Newport, Gwent: RAF Displays at Newport Military Show
- 7 Filey, N Yorks: RAF Displays at Filey Lifeboat Day
- 8 Strathallan, Perth: Stathallen Flying Day
- 8 Sandown, IoW: Vintage & Classic Aircraft Fly-in
- 8 Popham, Hants: Miller Memorial Auster Fly-in
- 8 Old Warden, Beds: Shuttleworth Informal Flying Occasion
- 8 Abbeyshrule, Co Longford: Air Display
- 11 RAF St Mawgan, Cornwall: International Air Display
- 11 Fowey, Cornwall: Red Arrows at Fowey Royal Regatta
- 14 RAF Alconbury, Cambs: USAFE Open Day
- 14 Faireyhouse Racecourse, Co Meath: Air Rally
- 14 Newtownards, Co Down: Ulster Air Show
- 14 Aberporth, Dyfed: Red Arrows at ATC Open Day
- 15 Coventry, West Midlands: RAFA Midlands Air Display
- 15 Jurby, IoM: Air Display
- 15 Faireyhouse Racecourse, Co Meath: Air Spectacular 82

- 18 Weymouth, Dorset: Red Arrows at Weymouth Carnival
- 18 Broadstairs, Kent: Red Arrows at Broadstairs Water Gala
- 18 Cromer, Norfolk: Red Arrows at Cromer Carnival
- 19 Southport, Lancs: Red Arrows at Southport Flower Show
- 19 Blackpool, Lancs: Red Arrows at RAF Town Show
- 21 Hoylake, Cheshire: Red Arrows at Lifeboat Day
- 21 Skegness, Lincs: Red Arrows at Skegness Carnival
- 22 Lincoln: Red Arrows at Lincoln Steam Spectacular
- 22 Rochester, Kent: Air Display
- 26 Dartmouth, Devon: Red Arrows at Dartmouth Royal Regatta
- 27 Sidmouth, Devon: Red Arrows at Sidmouth Regatta
- 27-29 Ashton Court, Bristol, Avon: International Balloon Fiesta
- 28 RAF Binbrook, Lincs: RAF Open Day & Air Display
- 28 Teesside Airport: Teesside Air Show
- 28-29 Crich, Derby: Transport Extravaganza
- 28-30 Finmere, Bucks: Vintage Aircraft Club Summer Camp
- 28-30 Popham, Hants: Microlight Weekend
- 28-30 Portsmouth, Hants: HM Dockyard Navy Days
- 28-30 Plymouth, Devon: HM Dockyard Navy Days
- 29 Tollerton, Notts: Nottingham Air Display
- 29 Leicester East: Leicester Air Show
- 29 Scone, Perth: Scottish Aircraft Collection Air Display
- 29 Old Warden, Beds: Shuttleworth Informal Flying Occasion
- 29-30 Essex Show Ground, Chelmsford: Battle-Attack Air Show
- 30 Halfpenny Green, Staffs: Air Display
- 30 Eye, Suffolk: Red Arrows at Eye Show
- 30 Peterborough, Cambs: Red Arrows at Expo 82
- 30 Oulton Broad, Suffolk: Red Arrows at Oulton Broad Regatta
- 30 St Albans, Herts: RAF Displays at St Albans Carnival

### September

- 4 RAF Finningley, S Yorks: Battle of Britain Open Day
- 4 RAF Leuchars, Fife: Battle of Britain Open Day
- 4 RAF Sealand, Clwyd: RAF Open Day
- 4 RAF Marham, Norfolk: Families Day
- 4 RAF Northolt, Gtr London: Families Day
- 5 Sandown, IoW: British Aircraft Fly-in
- 5 Duxford, Cambs: Vintage Flying Day
- 5 Inverness, Highlands: Highland Air Show
- 5 Kirkwall, Orkney: Open Day & Red Arrows Display
- 5-11 Dunstable, Beds: Vintage Glider Week & Competition



## COME AND SEE...

This year we'll be at all the major military air displays in the UK. Look out for our red mobile sales unit where you will be able to see a large selection of our stickers, patches and prints plus RED ARROWS SOUVENIRS.  
And we'll be pleased to see you.



- 5-12 Farnborough, Hants: SBAC International Exhibition and Flying Display  
8 Abingdon, Berks: Red Arrows at ex-POW Reunion  
12 Wroughton, Wilts: Science Museum Open Day  
12 Popham, Hants: Piper Rag & Stick Fly-in  
16 Guernsey, CI: Battle of Britain Display  
16 Jersey, CI: Battle of Britain Display  
18 RAF Abingdon, Berks: Battle of Britain Open Day

- 18 RAF St Athan, S Glamorgan: Battle of Britain Open Day  
18 RAF Lyneham, Wilts: Families Day  
26 Old Warden, Beds: Shuttleworth Pageant  
27-2 October — Kilkeny Castle, Kilkeny: 12th Irish Hot Air Balloon Championships

#### October

- 3 Shotteswell, Oxon: Vintage Aircraft Club Spot Landing Competition  
10 Sandown IoW: End of Season Fly-in

- 10 Popham, Hants: Veteran & Vintage Fly & Drive-in  
17 Duxford, Cambs: Local End of Season Flying Day  
31 Old Warden, Beds: Informal Flying Occasion

Readers are reminded that certain of the above events may not necessarily be open to the public, eg the Families Day-type occasions at RAF stations. Neither the editors nor the publishers can be held responsible for any changes in the calendar of events, but every effort will be made to regularly renew and, where necessary, revise the list at monthly intervals during the remainder of 1982. As previously, these up-dates will appear in the 'airview' column of the magazine.

## airevents abroad 82

At the time of going to press, details had been received of the following air events to be held abroad in 1982. Notification of additional shows will appear in the 'airview' column of *Aircraft Illustrated* as soon as further details are available.

#### May

- 8-9 Tempelhof, Berlin: USAFE Open House  
16 Rhein-Main AB, W Germany: USAFE Open House  
18-25 Hannover airport, W Germany: ILA 82 Hannover International Aerospace Exhibition  
20-21 Buckeburg, W Germany: International Helicopter forum  
22 Zweibrucken AB, W Germany: USAFE Open House  
26-6 June — Bayreuth, Bavaria, W Germany: German gliding championships

#### June

- 3-6 Grenoble, France: International Business and Light Aviation Show  
3-6 Stauning, Denmark: '15th International KZ Rally'  
5-6 London airport, Ontario, Canada: London International Air Show  
5-6 Sion, Switzerland: International Air Show  
10-14 Cannes, France: International Light Aviation Show  
13 Bitburg AB, W Germany: USAFE Open House  
17 Lindsey AS, W Germany: USAFE Open House  
19-23 Malta: International Air Rally  
20 Aviano AB, Italy: USAFE Open House  
27 Sembach AB, Germany: USAFE Open House

#### July

- 16-17 Orillia Airport, Ontario, Canada: EAA of Canada Fly-in and Convention  
18 Spangdahlem AB, Germany: USAFE Open House  
31-7 August — Oshkosh, Wi, USA: EAA Convention

#### August

- 1 Ramstein AB, W Germany: USAFE Open House  
7-8 Hahn AB, W Germany: USAFE Open House  
12-14 Abbotsford, BC, Canada: 21st Abbotsford International Airshow

#### October

- 7-10 Harlingen, Tx, USA: 'Airsho 82' Confederate Air Force

#### USAF Open House events, through April-November

#### April

- 10 Vance AFB, Ok  
17 Nellis AFB, Nv

#### May

- 1 McChord AFB, Wa  
1 Langley AFB, Va  
7 Andrews AFB, Md  
8 Andrews AFB, Md: Joint Services Open House  
8 Keesler AFB, Mi  
9 Dover AFB, De  
15 Peterson AFB, Co  
15-16 Randolph AFB, Tx  
16 Fairchild AFB, Wa  
22-23 Little Rock, Ar  
28-30 Anderson AFB, Guam  
31 McGuire AFB, NJ

#### June

- 19 Chanute AFB, Il  
19 Goodfellow AFB, Tx

● **Stop Press:** USAF has cancelled all its Open House events in West Germany this year, but the Command's Open Houses in the UK will proceed as planned. More details in our June issue — Ed.

#### July

- 28 Malmstrom AFB, Mt  
28 Francis E. Warren, Wt

#### August

- 5-8 Grand Forks AFB, ND  
5-8 Minot AFB, ND  
21-22 Travis AFB, Ca

#### September

- 11 Reese AFB, Tx  
18 Mather AFB, Ca  
18 Greater Pittsburg IAP, Pa

#### October

- 3 Kirtland AFB, NM  
9-10 Charleston AFB, SC  
16 Laughlin AFB, Tx  
23 Norton AFB, Ca

#### November

- 11 March AFB, Ca  
11 Vandenberg AFB, Ca

**Right:** Among the growing number of beautifully constructed replicas appearing at UK air shows is Mike Beach's Bleriot Type XI. The aircraft is allotted the registration G-LOTI and was displayed at the Fair Oaks Air Day on 2 August 1981; this year's event at the Surrey Airfield will take place on 1 August.  
*Photo: Allan Burney*

**Below:** Photography at air shows can often provide some very rewarding results, such as in this composition where the unusual head-on view of the SR-71 'Blackbird' takes on a somewhat sinister appearance. The aircraft belongs to the 9th SRW and the venue was the Open House at March AFB, Ca on 1 November 1981. *Photo: Frank B. Mormillo*







Top: One of the interesting C-130 Hercules serviced by Marshalls at Cambridge in the past few months is C-130E, 84001, of the RSwedAF. Photo: Peter R. March

Above: Components of Vulcan B2, XL318 ex-No 617 Squadron, have begun to arrive at RAF Hendon and are being temporarily 'stored' in the RAF Museum's car park. The Vulcan is destined to become one of the exhibits in the new RAF Bomber Command Museum that is being constructed at the Hendon complex. Photo: Francois Prins

Continued from page 204

seas aircraft have also come in for modifications and repair; included among these has been 84001 C-130E of the RSwedAF, TR-KKC an L-100-20 of the Gabon AF and 311 a C-130H of the United Arab Emirates AF.

Although the last RAF Whirlwinds with No 22 Squadron were officially retired early in December, one aircraft remained in service until the end of the year at RAF Chivenor. Latest Hawk to be delivered to No 63 Squadron of 2 TWU was XX352 in January. New arrivals at RAF Coltishall have been two retired aircraft for the station's Battle Damage Repair Flight, Canberra PR7 WT532 and Hunter F6 XF386. Both are likely to end up with the fire section in due time. The School of Technical Training at RAF Cosford has also received a Canberra, ex-No 100 Squadron B2 WJ640, as has RAF Coningsby where ex-No 13 Squadron PR7 XJ815 is now resident. Many of the No 29 Squadron and No 228 OCU Phantoms resident have now been re-painted in the grey colour scheme. Further additions to the Tornado complement of the TTTE at RAF Cottesmore are ZA319 /B-11 and 43+26 /G-76. It is expected that the first Italian AF machine to join the unit will be in service by 1 April.

RNAS Culdrose continues to be a very busy base. No 705 Squadron operates 20 Gazelle HT2s while No 706 Squadron is now flying an increasing number of Sea King HAS5s alongside its HAS2As; included in the former are XZ922/580-CU, ZA129/

ZA542, ZA544, ZA545, ZA546, ZA547, ZA549, ZA550, ZA551, ZA552, ZA553, ZA554, ZA555, ZA558, ZA559, ZA560, ZA561, ZA562, ZA563, ZA564, ZA585.

The USAF have been taking a look at RAF Kemble prompted by the MoD who want to close the base next year. It is thought possible that the 'Red Arrows' might move to RAF Scampton as a new 'home'. Customers have been found for two of the ex-Navy Sea Devons that have been offered for sale since No 781 Squadron closed down last year. XJ348 has moved to Shoreham where it has recently been registered G-NAVY by its new owner. The second aircraft VP967 was not a real 'Sea' Devon as it was an ex-RAF machine that passed to the FAA and was used by Culdrose Station Flight for a number of years. It has been registered G-KOOL for future flying by its owner who also has Sea Prince G-BIDN. A retired aircraft which seems unlikely to pass into private hands is the ex-RAE Meteor NF11 WD790 which now resides at RAF Leeming with the Vintage Pair, Meteor WF791 and Vampire XH304. The NF11 will be cannibalised to keep the T7 flying. At RAF Lossiemouth No 216 Squadron is due to be formed with Buccaneers this year to operate alongside No 12 Squadron. Work has finished on the restoration of Provost T1 WW397 at RAF Lyneham and it made a number of high speed taxis last year, but flying is held up by red tape at the Ministry of Defence as the aircraft had been 'officially retired'. Fourteen Hercules C3s had been put into service by the middle of March.

The Army Air Corps is forming a Lynx display team later this year. Its six helicopters and pilots will come from the Lynx Conversion Flight at Middle Wallop and will be known as the 'Silver Eagles'. Lynx likely to be used include XZ221, XZ222, XZ648 and XZ649. Representative helicopters from many of the Corps' units will return to Middle Wallop for the Silver Jubilee event in July. At RAF Mildenhall the first quarter of this year has seen U-2R 68-10337 and SR-71A 64-17980 resident with Detachment 4 of the 9th SRW. The USN Air Facility continues to use UC-12Bs BuAer Nos 161322 (8D) and 161503 (8G), having replaced the last C-131F 141023 last October. It is possible that a CP-3 Orion will later be used for transport/cargo tasks.

Destruction of Vulcan B2s at RAF St Athan is proceeding rapidly. Aircraft already scrapped or about to receive attention in February were: XH559, XL387, XM570, XM574, XM599, XM602, XM608,

XM611, XM646 and XM650. Much of the Harrier and Sea Harrier work is to be transferred to RAF St Athan and from June 1982 the Engineering Wing will have responsibility for all major work on the type. This will include work on the Navy's T4s which will be re-designated T4Ms. Two Sea Harrier FRS1s ZA177 and ZA191 have gone into store at the South Wales airfield. Although RAF St Mawgan lost its Canberras of No 7 Squadron at the end of last year, a number of the aircraft have returned on detachment in the guise of No 100 Squadron, but now marked with the two letter individual coding. It is hoped that Shackleton AEW2 WL795 which arrived last November will eventually become a gate guardian.

The disbanding of the remaining Vulcan squadrons at RAF Scampton and Waddington will be complete by mid-summer: No 9 Squadron is due to disband on 29 April having been preceded by No 617 Squadron on 22 December last year, No 35 Squadron at the end of February 1982, No 27 Squadron by the end of March and Nos 44, 50 and 101 Squadrons at the end of June. Two more Vulcans have been identified for preservation, XM603 which is to go to British Aerospace at Woodford and XJ824 will fly in to Duxford for the Imperial War Museum. XL318 was being dismantled at Scampton in March for transport to the new Bomber Command Museum; XL317 has been flown to Akrotiri and seems likely to end up being preserved there as this base was a major NEAF Vulcan operator. Two Vulcans scrapped at RAF Scampton in February were XL425 and XL443.

A further trio of Mystere IVAs Nos 81 (8-NS), 99 (8-NC) and 184 (8-NU) arrived at RAF Sculthorpe in January to add to Nos 64, 139, 146 and 180 already in situ. The arrival of the fourth squadron to join the 20th TFW at RAF Upper Heyford, announced as a squadron of EF-111As, has yet to be given a firm date. Likewise the reported additional (third) A-10 squadron at RAF Woodbridge to bring the 81st TFW to seven squadrons, has yet to be given a date.

The RAF's Canberra force at RAF Wyton will, for a few months have No 39 Squadron with its PR9s until it disbands later in the year leaving a small flight of PR aircraft for essential tasks; No 100 Squadron which has its former B2s and E15s from Marham, together with a quartet of ex-No 13 Squadron PR7s and seven of No 7 Squadrons TT18s, giving the unit some two dozen aircraft. No 360 Squadron also remains with a dozen T17s on strength and No 231 OCU has nine B2/T4s. With so many aircraft a two-letter coding system has been introduced with No 39 Squadron allocated 'A', No 231 OCU 'B', No 100 Squadron 'C' and No 360 Squadron 'E'. And the missing letter 'D' prefix? This has been given to the four Devons of No 207 Squadron.

RNAY Wroughton is playing host to an increasing number of Wasp HAS1s as they are replaced by Lynx. Early this year 28 were in residence. Other machines held here include Wessex HAS3s XM327, XM833, XM923, XM927, XP137 and XS127 and the trio of Green Parrot Wessex HU5s of MAY 1982

No 781 Squadron XT487, XT770 and XT772. Further Sea Harrier deliveries to RNAS Yeovilton this year have been ZA175-ZA177, and ZA190-ZA191, two of which have gone into storage, while ZA175 had become 004/N with No 801 Squadron in February. Harrier T4 XW927 was replaced by XW934 in January.

### Civil snippets

Dan-Air is undergoing a major re-organisation and rationalisation. The fleet of BAe748s is being thinned out considerably. Already G-ATMI has departed for Air BVI on lease and a trio (G-ATMJ, G-AZSU and G-BEBA) will be going to British Airways to replace the last Viscounts in use in Scotland. Dan-Air is establishing a new company, Metropolitan Airways to operate the Link-City services using two Twin Otters based at Newcastle and Bournemouth. Euroflite, the airline side of Executive Express, is planning to lease two Bandeirantes to operate a new service from Cardiff and Bristol through Luton to Brussels. These aircraft would be based at Cardiff and maintained by British Air Ferries which has taken over the former British Airways maintenance base. Instone Airlines is obtaining a second ex-New Zealand Bristol Freighter, ZK-EPD for its charter-cargo work. The 'new' equipment reported for the Granada TV 'Airline' series is a Constellation. Aces High, the company that provides the flying sequences is believed to be working on N7777G at Dublin Airport and if successful it should be seen in Ruskin Air Services colours at Leeds in August ready for filming the new series.

It seems to have passed largely unnoticed last year that a Bede BD-5 was at last flown in this country. G-BGLB built by Bill Sawney was flown from Boscombe Down last summer, powered by a three-cylinder Hirth engine. Some three hours' test flying was completed before it moved to

Wellesbourne Mountford. Unfortunately it suffered engine failure on its first flight here and has since been without a powerplant as the Hirth needed a complete rebuild and some modifications. In the meantime Peter Bayliss has been nearing the completion of G-BJCD. This is a stretched fuselage BD5 with longer span wings and will be powered by a 1200cc Honda Civic engine.

A second ex-Irish Air Corps Provost, 177 has been purchased in the UK and it is now at Shobdon where it is being restored to flying condition for its new owner. Also at this Hereford airfield Tiger Moth G-ANOH is under restoration. An unlikely place to find a collection of civil aircraft being prepared to fly after rebuild is RAF Brize Norton. However, Tiger Moths G-ANRN (formerly a coupé version) and G-BHLT (ex-South African) and Taylor Monoplane G-AWGZ were present in mid-February. Yet another Tiger Moth, G-ANSM, was nearing the end of a lengthy rebuild at Dunkeswell early this year.

For some of this month's contributions we would like to thank: R. Bonser, A. J. Brown, I. Burnett, D. Conway, J. Guthrie, A. March, J. S. Mines, R. Rudhall, E. Shackleton and R. Wright. Also the publications: *Air North*, *Air Scotland*, *Air Strip*, *Aviation Ireland*, *British Aviation Review*, *Cotswold Messenger*, *Humberside Air Review*, *Irish Air Letter*, *Popular Flying*, *Prestwick Airport Letter*, *Scottish Air News*, *Skyward* and *South West Aviation News*.

Below: Constellation N7777G, long-term resident at Dublin Airport, is reported to be the subject for Aces High's attention to get it flying by August for filming a new series of the TV programme 'Airline'. Photo: Peter R. March

Bottom: Bede BD-5B, G-BGLB, at Wellesbourne Mountford on 4 May. The aircraft was the first UK-registered BD-5 to fly when it made its maiden flight from Boscombe Down last summer. Photo: Roger Wright



Below: Air BVI (British Virgin Islands) has leased BAe748, G-ATMI, from Dan-Air. The aircraft was photographed at Bermuda on delivery to the airline. Photo: Austin J. Brown







# The Royal Air Force Today and Tomorrow

R. A. Mason

From the Harrier hides of West Germany to the jungles of Belize, from the protection of the 'Offshore Tapestry' around the coasts of the UK to the interception of the Russian 'Bears' over Scotland, from the fighter pilot to the latest trainee, this volume provides a complete coverage of Britain's air force with a superb collection of action photographs.

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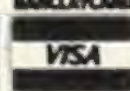
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